

SMALL NAVIGATION PROJECT

**COREA HARBOR
GOULDSBORO, MAINE**

**DETAILED PROJECT REPORT
AND
ENVIRONMENTAL
ASSESSMENT**

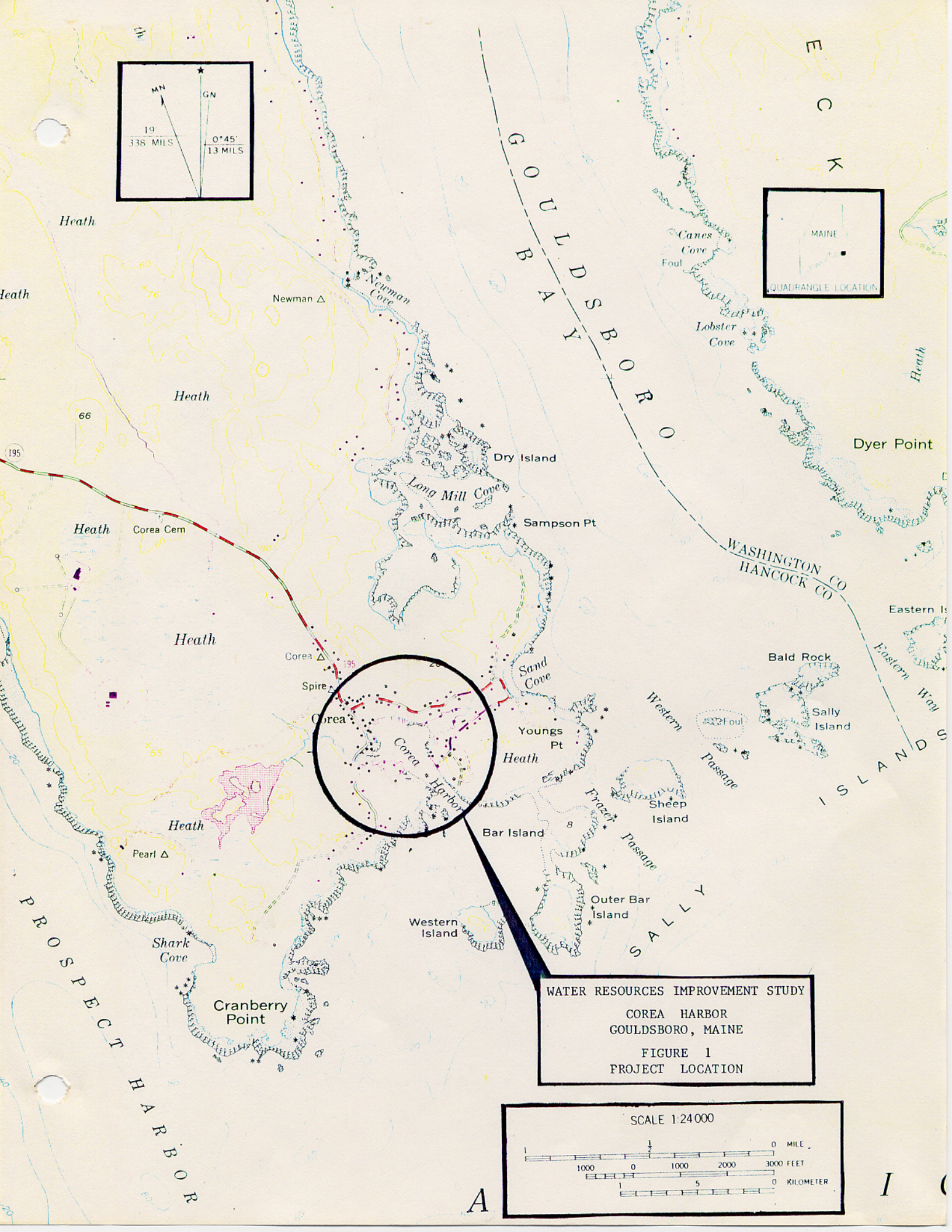
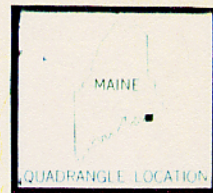
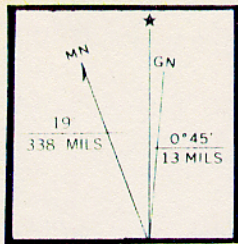


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New England Division

MARCH 1981

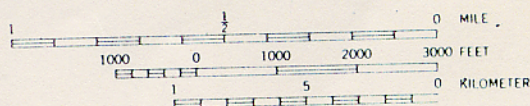


WATER RESOURCES IMPROVEMENT STUDY

COREA HARBOR
GOULDSBORO, MAINE

FIGURE 1
PROJECT LOCATION

SCALE 1:24 000



SYLLABUS

This study investigated the existing navigation system in Corea Harbor, Gouldsboro, Maine, and evaluated future trends and needs in an attempt to determine the feasibility of providing navigation improvements for commercial fishing vessels.

The paramount needs identified are reliable and safe access to and adequate mooring area in the harbor. The provision of adequate navigation facilities will allow the town of Gouldsboro to utilize its water resources in a more effective manner.

Several alternatives were analyzed in order to identify the optimal improvement plan for the present and future needs of commercial fishing activities. The results of this analysis indicate the optimum plan of improvement at this time consists of an access channel 8 feet deep and 100 feet wide, extending from deep water for a distance of approximately 2,000 feet to the existing Federal anchorage basin and three additional acres of mooring at a depth of 6 feet mlw.

Based on projected waterway use, the selected plan is economically justified. Total cost would be \$678,000. Annual charges of \$55,300 when compared to annual project benefits of \$144,900 yield a benefit-cost ratio of 2.6 to 1. Due to the commercial nature of the project, the cost would be borne totally by the Federal Government.

It is expected that maintenance of the channel and anchorages will be required every 25 years. Maintenance of the project will be a Federal responsibility, contingent upon the availability of maintenance funds, the continuing justification of the project, and the environmental acceptability of required maintenance activities.

The Division Engineer recommends that, subject to the conditions of non-Federal cooperation outlined in this report, the foregoing plan of improvement for Corea Harbor, Gouldsboro, Maine, be adopted.

Corea Harbor
Gouldsboro, Maine

Detailed Project Report

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2	Formulation, Assessment and Evaluation of Detailed Plans
3	Public Views and Responses
4	Engineering Investigation, Design and Cost Estimates
5	Economic and Social Analysis

INTRODUCTION

This report is a detailed engineering, economic, and environmental feasibility study of navigation improvements for commercial fishing vessels at Corea Harbor, located in the town of Gouldsboro, Hancock County, Maine.

Corea Harbor is situated southwest of Gouldsboro Bay. As shown in Figure I, the mouth of the harbor is formed by three islands and the mainland, requiring entrance from the south. Existing navigation facilities consist of a five and one-half acre anchorage, 600 feet long by 400 feet wide and 8 feet deep mlw, located at the head of the harbor. Access to the harbor is gained via a natural channel approximately 2,000 feet in length and a general depth of 8 feet mean low water for a width varying from 5 to 200 feet.

At present, approximately 40 lobster boats operate within this area. A well established Lobstermen's Co-op having 44 active members, a dock, baithouse, and lobster handling facilities is located along the western shore of the harbor. Additionally, a dozen lobstermen's docks and docking facilities owned and operated by a local boat builder are located along the periphery of the harbor.

Commercial fishing is the mainstay of the community's economy. Lobster fishing is the predominant activity with a small supplementary scallop fishery. Increases in the competition for and growth of Maine's commercial fisheries have resulted in overcrowding within Corea Harbor. If further expansion is to occur, improvement of the harbor's navigation conditions to facilitate growth in the level of commercial fishing activity is necessary.

The town of Gouldsboro, in recognizing the need for harbor improvements to support its commercial fleet, formally requested that the New England Division of the Corps of Engineers study the feasibility of providing navigation improvements in Corea Harbor under the continuing authority of Section 107 of the 1960 River and Harbor Act. The New England Division completed a Reconnaissance Report which established the need and justification for a more detailed study of Corea Harbor navigation improvement options. In a letter dated 2 March 1977, the town of Gouldsboro concurred with the findings of the Reconnaissance Report and recommended that the Detailed Project Report be undertaken. This report summarizes the study process involved with and conclusions of the detailed feasibility analysis of navigation improvements in Corea Harbor.

Study Authority

This study was initiated by the New England Division of the U.S. Army Corps of Engineers at the request of officials of the town of Gouldsboro in a letter dated 19 January 1976 (see Appendix 3). This study was prepared under the authority of Section 107 of the 1960 River and Harbor Act, P.L. 86-645, as amended.

Scope of the Study

The scope of this study includes performance of a comprehensive Water Resources Improvement Study and preparation of a Detailed Project Report consisting of:

1. Determination of the navigational needs of the study area.
2. Development of alternative navigation improvement plans.
3. Evaluation of the economic, environmental, and social impacts of the alternative plans.
4. Recommendation of navigation improvements that are economically feasible, environmentally acceptable and socially beneficial.

This study is oriented solely towards providing for the present and future navigational needs of commercial fishing vessels operating from Corea Harbor. At present there are no recreational craft, nor is any recreational boating development anticipated within the harbor.

The geographic scope of this study is generally limited to Corea Harbor. Within this area, environmental, economic, engineering, and sociologic parameters are analyzed in the depth and detail necessary to determine the most feasible plan of improvement and to fully evaluate the impacts of that plan.

Study Participants and Coordination

Participation of and coordination between various Federal, State, regional, and local government agencies formed an integral component of the study process.

Coordination at the Federal level included the Environmental Protection Agency, The National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the U.S. Coast Guard.

Participatory agencies at the State level involved in the study were the Department of Marine Resources, the Department of Environmental Protection, the Maine Department of Conservation, and the State of Maine Bureau of Geology.

At the regional level, participants included the Eastern Mid-Coast Regional Planning Commission and the Mid-Coast Human Resource Council.

The town of Gouldsboro was consulted throughout the planning effort. Those involved included the Board of Selectmen, town manager, and other interested members of the community.

Appendix 3 contains a complete list of the government agencies consulted during the course of study and a summary of their views and comments on the proposed plan of improvement.

Studies of Others

At present, there are no other existing plans of improvement being studied for improvements in Corea Harbor.

The Study Process and Report

The initial efforts in the study process consisted of a comprehensive inventory of available resources, data and information, the performance of hydrographic, topographic and seismic surveys and the development of alternative feasible base plans. Throughout this effort, public and private inputs were incorporated via close contact and coordination with public officials and interested parties. Assimilation of available information and integration of public views provided for the establishment of baseline conditions from which management measures, planning objectives, and planning constraints were identified. Preliminary improvement alternatives were developed and evaluated in terms of these objectives and constraints. Based on comments received following the presentation of the preliminary plans to local officials and concerned groups at a meeting on 13 March 1979, a number of alternative plans of improvement were selected for detailed study.

This Detailed Project Report consists of a Main Report and supporting appendices. The body of the Main Report is structured in accordance with the planning process followed during the course of the study. It is organized as follows: Problem Identification, Formulation of Preliminary Plans, Assessment and Evaluation of Detailed Plans, Comparison of Detailed Plans, and an Environmental Assessment.

The report has five appendices: Appendix 1, Problem Identification, supplements the material in the first two sections of this report. Appendix 2 addresses the formulation, assessment and evaluation of alternative plans. Appendix 3 summarizes public views and responses. Appendix 4 contains supporting engineering data and analyses. Appendix 5 contains information on benefit-cost studies.

PROBLEM IDENTIFICATION

This portion of the report sets forth the nature and scope of the navigation problems and needs that stimulated the towns request for this study of navigation improvements, and establishes the planning objectives and constraints which give direction to subsequent planning tasks.

National Objectives

Planning for navigation improvements in Corea Harbor is based on the national objectives of National Economic Development (NED) and enhancement of Environmental Quality (EQ) as set forth in 1973 by the National Water Resources Council in Principles and Standards for Planning Water and Related Land Resources. The purpose of the Principles and Standards is to promote the quality of life by planning for the equal attainment of the following national objectives:

NED Objective -

To enhance national economic development by increasing the value of the nation's output of goods and services and by improving national economic efficiency.

EQ Objective -

To enhance the quality of the environment by the management, conservation, preservation, creation, restoration or improvement of certain natural resources, cultural resources and ecological systems.

Existing Conditions

Corea Harbor is located within the village of Corea, one of seven villages comprising the town of Gouldsboro, Hancock County, Maine. It is located 130 miles northeast of Portland and 55 miles southeast of Bangor. The harbor is a small cove situated just west of Gouldsboro Bay and northeast of Prospect Harbor. Several islands, including Bar Island, Outer Bar Island and Western Island, form the southeasterly boundary at the mouth of the harbor.

The village of Corea is typical of the coastal fishing communities along this stretch of Maine's shoreline. At present, approximately 40 boats are permanently moored at Corea. These vessels, averaging 33 feet in length, are all commercial lobster and/or scallop boats.

Population estimates by the Maine State Planning Office indicate a 13.0 percent rate of growth over Gouldsboro's 1970 population of 1,310. Although no official count has been taken, the population in the village of Corea is estimated to be 220 on a year round basis.

The resident labor force averaged 778 persons during 1979, with an unemployment rate of 11.1 percent for that year. Many of these employed persons not working in the areas' manufacturing, canning, and retail establishments are self-employed within the fishing industry.

Of Gouldsboro's area of 32,225 acres, approximately 90 percent is devoted to resource production. Residential development, which is predominantly single-family units, is concentrated within throughout the seven villages which comprise the town of Gouldsboro.

The existing Federal navigation project, as shown on Figure 2, consists of a five and one-half acre anchorage constructed by the U.S. Army Corps of Engineers in 1938. This anchorage, measuring 600 feet long, 400 feet wide and 8 feet deep mlw, comprises the only Federal navigation facility within Corea Harbor.

Land use around the periphery of the harbor is strictly commercial. There is a well established cooperative, Corea Lobster Co-op, Inc., located on the eastern shore. This co-op established in 1970, provides its present 44 members with an outlet for the marketing of lobsters and scallops and additional services. The facilities of the Co-op include a main dock, associated facilities for handling and storing lobsters, scallops and bait and three buildings totalling approximately 1,000 sq. ft.

In addition to the Co-op facilities, there are 12 piers located along the edge of the existing anchorage. These privately-owned facilities are used to store and work on lobster boats and fishing gear. Additionally, there is a docking facility owned and operated by an independent boat builder.

The geologic profile in the Corea Harbor area consists of bedrock overlain by shallow deposits of peat, sands, and gravels. There are several isolated marine deposits (clays) located north, south and west of the village.

The tide in the Corea Harbor area averages about 11.5 feet above mean low water or 5.75 feet above National Geodetic Vertical Datum (NGVD). The 100-year surge has been determined to be about 10 feet above NGVD.

Strong southerly winds in excess of 21 knots occur fairly evenly throughout the year. Very heavy weather conditions of extreme winds, waves and surge occur during northeasters. Strong southerly winds often precede the classical northeast winds associated with a northeaster.

Currents within the harbor area are relatively small. Maximum currents outside the harbor area average three to five knots.

The shoreline is principally weathered bedrock with sand beaches in the island cover and a bar between Bar Island and the mainland. There is a mud flat at the northeast portion of the inner harbor during lower periods of the tide.

The water quality within the project area has been designated class SA by the Maine Department of Environmental Protection, the highest quality classification available. Class SA waters are suitable for all clean water usages, including water contact recreation and fishing. These waters are also suitable for the harvesting and propagation of shellfish and for a fish and wildlife habitat. There is also a small freshwater brook emptying into the harbor at its head.

Further detailed description of the study area is contained in Appendix 1.

Conditions If No Federal Action Taken

Without navigation improvements a general decline in the fishing industry based in Corea Harbor would occur, resulting in a reduced fleet and the abandonment of plans for the development of finfishing operations within Corea. The cost of upgrading and improving the navigation system in Corea without Federal funding would most certainly be economically prohibitive.

With no additional anchorage space, the harbor would continue to be utilized below its potential capacity. Overcrowded conditions would persist with collision damages continuing. Although eventual relocation and retirement of some vessels may reduce the damages, replacement with larger vessels could sustain the overcrowded condition.

The poor channel conditions would continue to threaten safe navigation. Two-way traffic would not be accommodated. Tidal navigation would be required with use of larger vessels, increasing lost fishing time and reducing landings. The desired development of a finfishing industry would not occur.

Therefore, as smaller fishing craft become more impractical to operate due to the market conditions in this industry, fishermen would invest in larger craft and if necessary relocate. The loss of the fleet would threaten the economic viability of the harbor as it loses its attractiveness relative to surrounding ports. It is anticipated that the Co-op would eventually be phased out.

The overall deterioration in the level of fishing activity without improvement would have a serious impact upon the economy of Gouldsboro. Basic employment would be drastically reduced in this major industry, adversely impacting the support employment and exports within the study area.

Problems, Needs, and Opportunities

The problems, needs, and opportunities of the study area are directly related to commercial fishing activity within Corea Harbor. Existing navigation facilities are inadequate to economically accommodate the existing fleet. Conditions existing in the harbor pose threats to safe navigation. Improvements are needed to alleviate navigation difficulties and damages presently experienced by fishermen operating from Corea. Although the problems may be summarized as overcrowding within the harbor, several areas of difficulty may be identified.

First, the existing five and one-half acre anchorage provides a design mooring space for 35 fishing vessels of 35 feet assuming that free

FIGURE 2
EXISTING FEDERAL
MOORING BASIN
5.5 ACRES
COMPLETED 1938

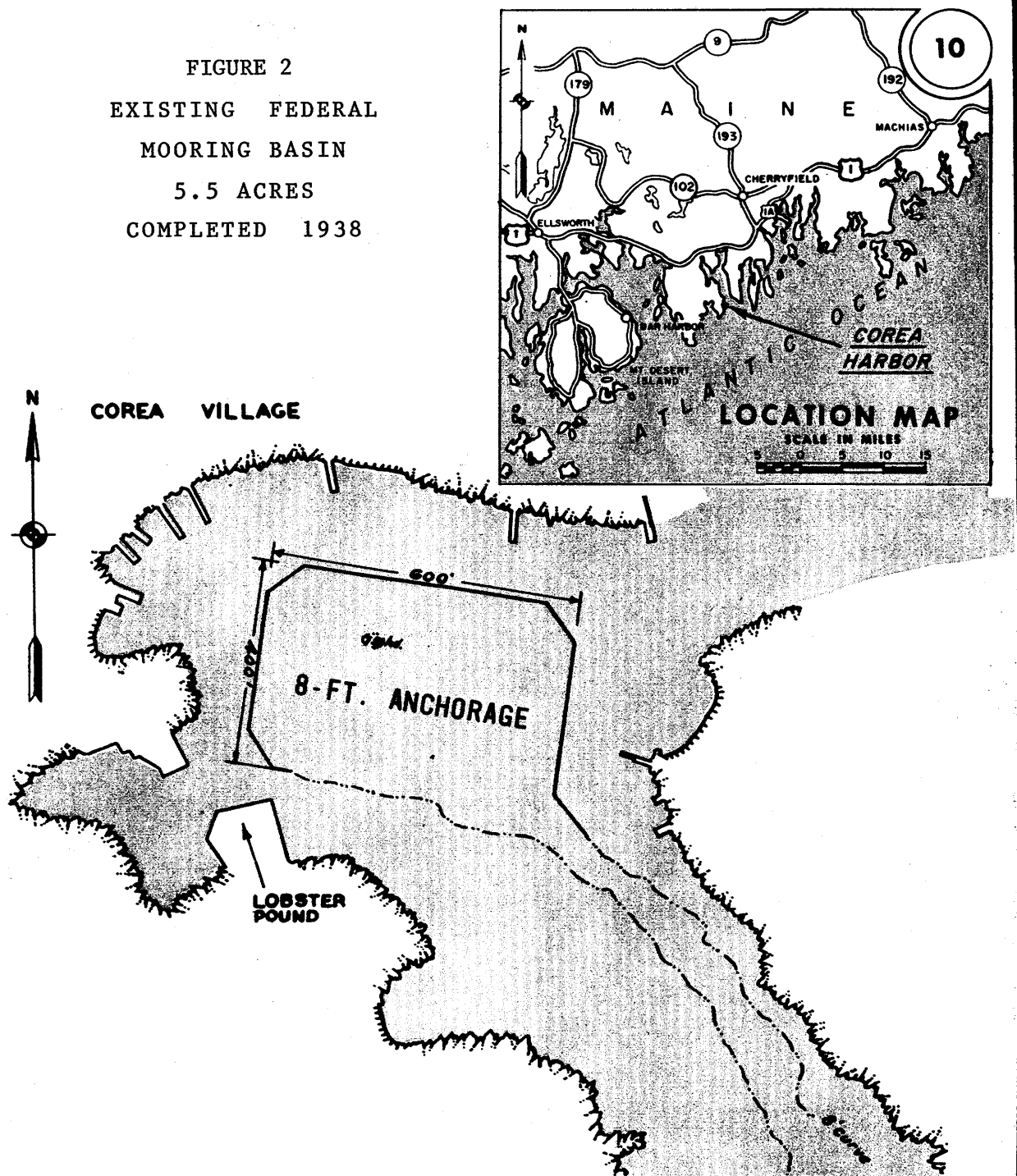


FIGURE 2.

**COREA HARBOR
MAINE**

30 SEPTEMBER 1976

SCALE IN FEET
100 0 100 200 300 400 500

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

swinging mooring is used. Presently 38 boats in a 35-40 foot class utilize this anchorage. Consequently, the lack of adequate anchorage area results in vessel damage due to chafing.

Second, insufficient depth in the entrance channel results in vessel delays. These navigation delays during various stage of the tide are minor for 35-foot vessels but are more significant for vessels of 40 feet and longer.

Third, the existence of a ledge outcropping into the channel reduces available channel width to the detriment of two-way navigation and more importantly posing a threat to safe navigation. Traffic in these areas of the channel must use extreme caution, resulting in slight delays.

Fourth, vessels moored in the crowded anchorage are often damaged from waves in the harbor. These damages are most significant during periods of severe storms with attendant winds from a southerly direction. At low tide an existing ledge formation serves as a natural breakwater. However, at water levels above mid tide, waves from the open Atlantic roll unhindered into the mooring area causing significant damage each year.

Fifth, inadequate navigation facilities prohibit Corea's fishermen from expanding their operation into other fisheries (e.g., finfish). Existing vessels are too small to safely and economically harvest these fisheries. Furthermore, existing facilities do not allow for the use of additional vessels, large or small.

Sixth, the existence of a bar between the mainland and Bar Island poses further tidal delays and safety problems. During times of moderate to heavy seas, navigation is dangerous for vessels attempting to enter or leave the harbor via the open sea between Cranberry Point and Western Island. During periods of high tide, boats may navigate a safer and more direct passage to and from the harbor from the northeast between the mainland (Young's Point) and Bar Island. Use of this passage would reduce both the risk of vessel navigation through the present channel and also the amount of time spent sailing to and from the fishing grounds.

The needs of the community based upon these navigation difficulties may be categorized into three areas: additional mooring space; channel dredging; and construction of a breakwater. Singularly or in combination, improvements in these areas would alleviate one or more of the problems identified.

Improvements to facilitate navigation in Corea Harbor would provide for increases in the efficiency of existing commercial fishing activities. Channel deepening in conjunction with the provision of additional anchorage areas would allow for maximum development of available fishery resources.

Improvements in the navigational conditions would afford increases in harbor utilization and navigation safety while alleviating property damages. Implementation of harbor modifications would provide the means for Corea's fishermen to maintain their competitive position and also a stimulus for expansion of the fishing fleet operating out of the harbor.

Planning Constraints

In attempting to develop any proposed plan of improvement to meet the needs identified above, consideration must be given to certain constraints that limit the scope of available measures that may solve the navigational problems experienced within Corea Harbor. Planning constraints are those parameters which are used to direct plan formulation and restrict adverse impacts. Such constraints may range across a broad spectrum, including natural conditions within the project site, technological states of the art, economic limits and legal restrictions.

Through consultation with government agencies and local interests, a number of concerns have been identified in this study. However, of these concerns, only three issues may be considered explicit planning constraints.

The constraints upon plan formulation are directly related to the scheduling of dredging activities and the disposal of dredged materials. Adverse impacts upon marine resources and existing fishing activity within the project area must be minimized.

The first constraint identified is to avoid disposal of any ledge removed during construction upon ocean sites where scallop dragging or other bottom-dragging fishing operations are used. If rock was disposed at these sites, interruption of trawling operations and damages to fishing gear could result. To minimize these potential adverse impacts upon commercial fishing, ledge removed from the harbor must not be disposed in identified ocean sites where dragging operations are used.

A second constraint regarding the ocean disposal of dredged material was identified in this study process. Any ocean site selected for disposal of dredged material must be suitable to allow for permanent settlement to minimize adverse impacts upon the environment. Therefore, if ocean disposal is selected, the site must be one of minimum bottom current velocities to reduce the extent of the marine environment affected and provide for permanent settlement of dredged materials.

The third and final constraint identified is to avoid any adverse impacts to the marine resources both within Corea Harbor and the surrounding waters. Any attempts to develop Corea Harbor in such a way as to allow the local fishing fleet to disrupt or deplete the existing marine resources would be detrimental to the long-term utilization of the harbor and its users.

In summary, planning constraints as identified are:

- . Avoid disposal of rock where dragging operations are used.
- . Minimize adverse impacts of dredged material outside the designated disposal site.
- . Avoid adverse impacts upon marine resources.

As stated previously, consultation with interested parties determined a number of concerns which should be identified and addressed.

Improvements of the navigation facilities would allow for increases in fishing intensity and harbor utilization in Corea. Increases in the harvesting of lobsters and scallops and the development of finfishing operations by Corea's fishing fleet must not adversely impact upon similar activities of others. This concern is further addressed in Appendix 5.

Adverse impacts associated with dredging operations and disposal of dredged material may potentially deteriorate the overall environment. Destruction of benthic fauna in the path of the dredge must be minimized. Land or ocean disposal must not adversely impact identified commercial marine resources. These concerns are evaluated in the section of this report titled "Environmental Assessment."

The Maine Historic Preservation Commission has identified one significant prehistoric archeological resource near the proposed dredging of the bar between Bar Island and the mainland (Appendix 3, letter dated 31 October 1979). This concern is addressed in the "Environmental Assessment" section of this report.

Inshore lobstering is the major fishery utilized by Corea fisherman. Lobsters are migratory, moving from one place to another according to reproductive cycles and schedules, water temperature and other factors.

While thousands of lobsters may inhabit the muddy bottom of the existing basin area within Corea Harbor, during the late summer and early fall the areas to be dredged support only negligible populations due to shallowness and the coarse nature of the material to be removed. Lobsters which winter in the harbor burrow deep in the mud within the existing project area and rarely in the more shallow areas considered for improvement dredging in this report. Therefore, any proposed dredging within Corea Harbor should not adversely impact upon the lobster population.

The commercial fishing interests at Corea Harbor must be able to deliver a reasonably constant volume of landings in order to maintain suitable stable markets for their catch. Any disruption of fishing and commercial operations could discourage some buyers from conducting business with Corea Harbor's commercial fishing concerns. For this reason, dredging and disposal operations must be scheduled so as to minimize interference with any commercial fishing operations in the project area.

Construction of any breakwater structure and dredging of the north-eastern anchorage and Bar Island Thoroughfare would remove a total of 2.1 acres of the intertidal zone. The area of the zone to be removed must be minimized since it is an important source of food for fish and higher level invertebrates and supports a substantial population of soft shelled clams. Since the area available for dredging within the harbor is limited by ledge formation, the 1.5 acres of the zone to be removed for the northeast anchorage is not considered significant.

Conducting dredging activities during unfavorable weather conditions can be dangerous and costly. Operation of dredging and blasting equipment must not be undertaken during adverse weather conditions. Disposal of dredged material during stormy weather can damage the environment in the vicinity of the disposal site through inaccurate dumping and increased area of dispersion of the material due to turbulence.

Another concern associated with the dredging of a thoroughfare channel between Bar Island and the mainland is the loss of Bar Island as an easily accessible recreation area. Presently, Bar Island, which is privately-owned, is used as a recreation area by the public, with the owner's consent, principally for hiking and sunbathing. Access to the island is gained by crossing the sandbar from the mainland by foot at mid and low tide. Dredging of the thoroughfare channel would limit access to this area to boaters. This concern is addressed in detail in Appendix 1.

Planning Objectives

Planning objectives for this study were established after analyzing the identified constraints and concerns regarding the use of water and related land resources in the study area. The purpose of these planning objectives is to translate identified needs, opportunities, and problems into specific objectives for the study. Planning objectives, as set forth herein, will be used in conjunction with planning constraints in the development of alternate plans that properly address area problems and needs. The establishment of clearly defined planning objectives is also essential in evaluating the various plans that have been studied. The relative merit of each plan is determined, in great part, by the degree to which it addresses and fulfills each planning objective.

Based on the discussions of problems, needs, and opportunities previously presented, three planning objectives have been identified as important guidelines for the formulation and evaluation of plans to meet the area needs and study objectives.

- Contribute to the safe mooring of commercial fishing vessels in Corea Harbor during the 1980-2030 period of analysis.

- Contribute to the safe navigation of commercial fishing vessels in Corea Harbor during the 1980-2030 period of analysis.

- Contribute to the diversification of existing and future harbor resources and facilities devoted to the utilization of commercial fisheries during the 1980-2030 period of analysis.

Consideration of these planning objectives and constraints led to the formulation of resource management alternatives that will be presented in the following section.

FORMULATION OF PRELIMINARY PLANS

Systematic consideration of the problems, needs, and opportunities led to the formulation of alternative preliminary plans. These plans, designed to achieve the planning objectives stated previously, were developed in light of the planning constraints. State and local objectives were also paramount considerations in the evaluation of alternative plans.

Management Measures

As the basis for formulating alternative plans, a broad range of management measures can be identified to address the planning objectives. Management measures can generally be categorized as either structural or non-structural.

Structural measures would essentially involve variations of construction in Corea Harbor to provide safe and economic navigation. Non-structural measures would generally involve other means to achieve the planning objectives at lower costs.

Due to the constraints, concerns, and objectives placed on the project, there are no feasible means to accomplish the project goals by implementation of non-structural solutions.

A review of all non-structural solutions led to the identification of two alternatives. These alternatives are discussed below:

Alternative 1: Maintain the status-quo thereby requiring fishermen to time their arrivals and departures so as to avoid transiting the harbor during periods of low water. By operating on the tide, fishermen could minimize the risk of vessel collisions or groundings.

Alternative 2: Relocate some or all of the vessels which presently operate out of Corea Harbor at neighboring ports.

As discussed in previous sections of this report, Alternative 1 does not lend itself to practical implementation. Maintenance of the status-quo would eventually become impossible. Recent trends in the New England fishing industry are clearly leading to larger multi-purpose fishing vessels. These vessels, capable of capitalizing on seasonal fish stocks will become more prevalent in the coming decades as increases in operating

costs will require fishermen to operate on a year-round basis. The vessels currently utilizing Corea Harbor are predominately inshore lobster boats and lack the capability to venture off-shore to harvest shellfish as they migrate into deeper water.

Should the Corea fishermen be denied the opportunity to modernize and upgrade the vessels the profitability of these operations would eventually disappear and these fishermen would have little choice but to implement the measures identified as Alternative 2.

To determine if those vessels which moor in Corea Harbor could be accommodated at other locations, a field survey of neighboring ports as shown on Figure 4 was undertaken to assess the feasibility of this option. The resultant survey indicated that there are no harbors of adequate size, protection, or facility capability within close proximity to Corea Harbor.

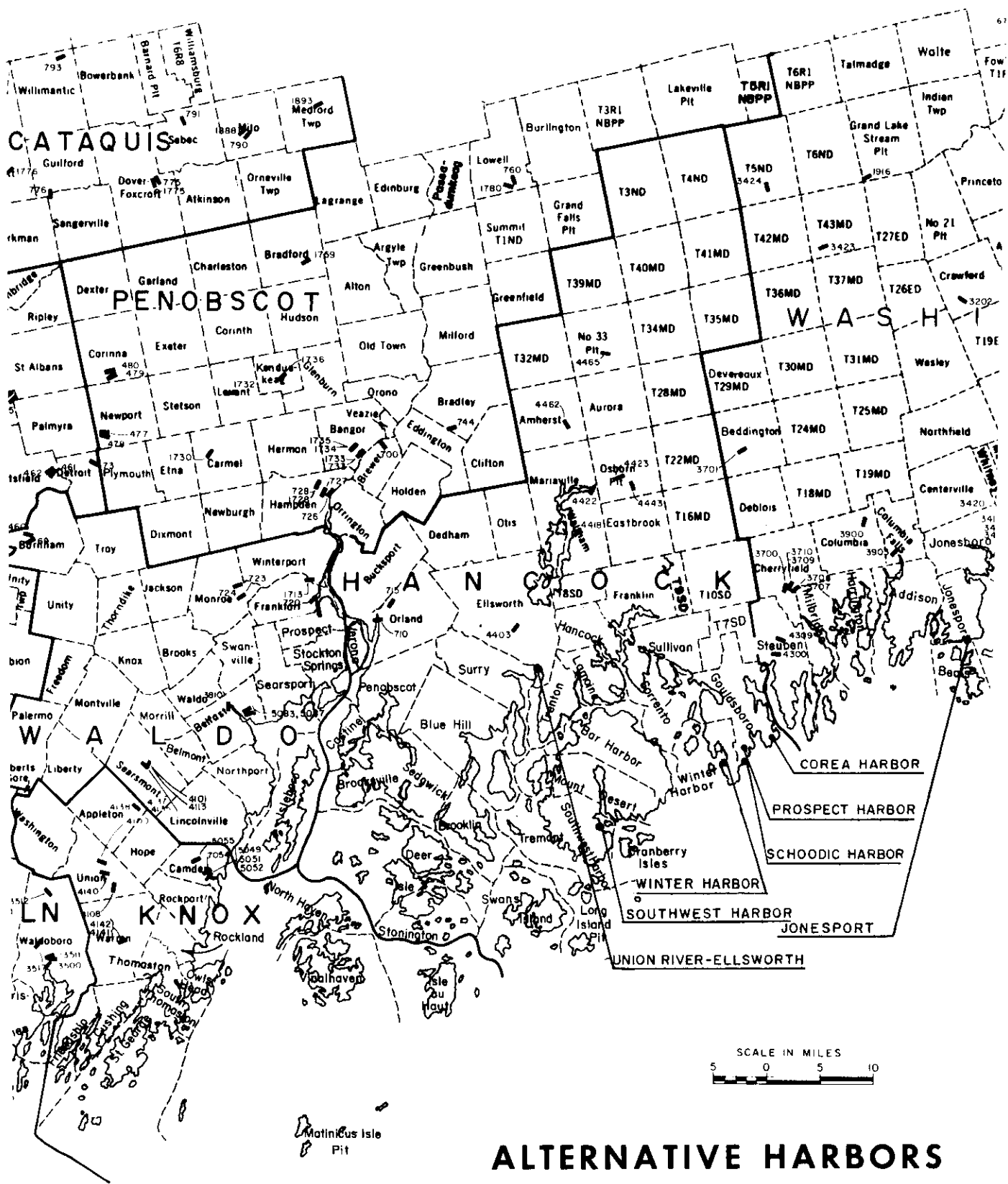
The closest harbor, approximately five miles by sea from Corea, is Prospect Harbor. Much smaller and much less desirable from a protection standpoint, Prospect Harbor is presently used by four to six lobster boats as a permanent mooring area. The harbor is almost totally unprotected from winds and waves from the southeast, south and southwest direction.

Schoodic Harbor, located 10 miles southwest of Corea Harbor is also relatively small and is unprotected from winds and waves. The closest harbor of a size similar to or larger than Corea in the southwest direction is Southwest Harbor, on Mount Desert Island, 30 miles away by sea, or the Union River Bay, near Ellsworth, also about 30 miles away.

In the northeasterly direction, there is no commercial harbor of a size that approaches that of Corea closer than Jonesport, which is approximately 25 miles away by sea.

Jonesport Harbor would not be a desirable location to relocate the Corea fleet. An ongoing Federal study into navigation problems at Jonesport currently indicates that at least 30 days per year of productive lobster fishing are lost due to rough harbor conditions. Since 1965, annual landings, on average, have declined due to the existing harbor conditions. Currently space limitations and navigation difficulties would preclude relocating Corea boats at Jonesport. In summary, Corea Harbor is the best developed, best protected harbor within 25 miles of itself and there is no harbor to which all or a portion of the Corea Harbor fleet can move for better facilities or protection and still be able to fish the same area.

This analysis, presented in more detail in Appendix 2, indicates that the identifiable non-structural solution would not meet any of the planning objectives and, therefore, led to the formulation of structural alternatives to solve the problems and meet the needs of commercial fishing activities in Corea Harbor.



ALTERNATIVE HARBORS

FIGURE 3

Plan Formulation Rationale

The first step in the formulation of alternative plans was to assess the existing fleet and to project the characteristics of the vessel fleet expected to operate in Corea. From these projections of the number, type, and size of boats, several navigation system configurations and designs were developed.

The projected commercial fishing fleet characteristics were based on information provided by the Maine Department of Marine Resources, extrapolation of trends observed in Corea Harbor and assumptions and estimates developed from experience in other ports. As Corea Harbor is utilized solely for commercial fishing operations, fleet dimensional characteristics were categorized separately for inshore and offshore boats. The proportion of the larger class of vessels in the anticipated fleet was increased due to an observed trend toward larger, more cost-effective boats and the establishment of offshore fisheries.

The majority of the projected fleet is expected to be inshore lobster boats greater than 35 feet in length. The percentage of these vessels in the 37-40 foot class is estimated to increase from 12 percent of the existing fleet to 25 percent by 1990. Additionally, two 55-foot finfishing draggers are expected to establish operations at Corea. Appendix 1 contains a breakdown of the existing and projected fleet.

Given this projected fleet, estimates of the additional landings by type, capability of shore-side support facilities to handle the fleet's increased catch, and the impacts of increased fishing intensity from Corea on the market and fish stands were investigated. Results of these analyses are discussed in Appendix 5.

During this investigation, four separate areas for improvement were investigated. Several alternative anchorage, channel and breakwater designs were developed and evaluated. Appendix 5 analyzes alternative navigation systems consisting of various combination and dimensions of the proposed improvements.

ANALYSIS OF PLANS CONSIDERED FOR PRELIMINARY PLANNING

Description of Alternatives

During the early stages of this planning effort, four alternative plans of improvement were developed and analyzed. They involved different dredging and construction options in an attempt to alleviate the navigation difficulties and fulfill the needs of Corea's commercial fishing fleet.

The structural alternatives are detailed below:

Alternative 1 - Expand the existing anchorage to the northeast.

Alternative 2 - Provide an access channel from deep water to the anchorage.

Alternative 3 - Provide an access channel between Bar Island and the mainland.

Alternative 4 - Provide a breakwater along the southwestern shore of the harbor.

Within each of the major alternatives, various dimensions, configurations, and alignments were investigated. The following section details the analysis undertaken for each of the alternatives.

Alternative 1 - This alternative deals with expanding the existing anchorage area to the northeast. Based on information obtained through borings and probes as detailed in Appendix 4, this area is relatively free of ledge rock to a depth sufficient to moor vessels safely. Further analysis has shown that dredging 1.5 acres from this area would be the optimal expansion size. Any effort to expand beyond the 1.5 acres would be impractical and infeasible for two primary reasons. First, additional area would not be required to sufficiently accommodate the existing fleet. Based on past experiences in the harbor under similar conditions, the 1.5 acres would be of sufficient size, in conjunction with the existing 5.5 acres to allow the fleet to alleviate the damages presently being incurred by the boats striking against one another.

Second, any attempt to expand further to the northeast would be economically prohibitive. As Appendix 5 indicates, four new boats are expected to be added to the fleet if additional mooring is provided. These four craft will be able to utilize the lobster resource without depleting the stocks or negatively impacting upon the existing fleet by reducing their yearly catch. Additional vessels, beyond the anticipated four, may require the fleet to distribute the catch amongst themselves as opposed to actually increasing the yearly individual yield. Based on this preliminary analysis, an anchorage area of 1.5 acres roughly rectangular in shape was determined to be feasible and, therefore, warranted further detailed study.

Alternative 2 - This alternative deals with providing an access channel of sufficient depth, width and length extending from deep water to the existing anchorage. An improved of minimum access channel would permit the lobster vessels safer access to the mooring area under all tidal conditions. Variations, primarily larger dimensions, would permit safe two-way traffic, and a still larger dimension would provide, in addition to two-way traffic, the introduction of larger finfishing vessels to utilize Corea Harbor as a base of operations. However, should the maximum channel dimension be chosen, the available anchorage area would be insufficient to accommodate any finfishing boats. Therefore, to insure the cost effectiveness of the maximum channel alignment, further increase in the available anchorage space was considered.

Located in the southwest portion of the harbor, approximately 1.5 acres would be available for construction to accommodate the commercial fishing boats. This is the maximum limit of the area available, for the site is bounded by the existing anchorage, large outcrops of ledge along the shoreline, and the proposed channel. Preliminary analysis has shown that Alternative 2 consisting of an access channel and a 1.5 acre anchorage located in the southwest harbor area is warranted for further detailed study.

Alternative 3 - This alternative deals with providing an access channel between Bar Island and the mainland. Construction of this channel would permit reliable and safe access to Gouldsboro Bay where scalloping and lobstering take place. It would also allow for a savings in cruising time as the fleet would no longer be required to navigate around the islands but instead could navigate between them. Preliminary analysis has shown that an access channel through the existing bar is warranted for further detailed study.

Alternative 4 - This alternative deals with providing a breakwater along the southwestern shore of the harbor entrance. Construction of a structure of this type would provide protection to the shore-front facilities within the harbor and those boats which are moored in the anchorage. Preliminary analysis has shown that a breakwater to protect the harbor from storm generated waves is warranted for further detailed study.

Comparative Assessment and Evaluation of Plans

Comparison of the entrance channel alternatives indicates that there is generally a tradeoff between dredging cost and vessel maneuverability and safety. As the proposed channel depths and widths increase, the amounts of dredging increase. Conditions existing in the natural approach channel require dredging in only certain areas to provide a uniform depth of 8 feet mlw and 100 foot width. Given the exposure of this area to southerly winds and waves, the above cited dimensions are preferable to provide maximum vessel safety. Detailed information on channel design is located in Appendix 4.

As stated above, difficulties in navigating the present entrance to the harbor between Western Island and Cranberry Point resulted in the option of dredging the bar between Bar Island and the mainland to provide an alternative route. Dredging of this area requires removal of substantial quantities of material given its existing elevation above mlw. Dredging of this channel would allow vessels to take advantage of the added protection from winds and waves afforded by the surrounding islands. As the amount of material to be removed is significant, minimum dimensions of six feet for a width of 60 feet should be considered for this area in consideration of the frequency of two-way traffic in this area and the quantities to be dredged.

Comparison of the breakwater construction options determined that a rubble-mound structure would be the most feasible from an engineering and economic view. This study process determined the optimum location for the structure to be on a ledge along the western shore extending into the harbor. This site would afford a solid base and optimum alignment for a breakwater requiring the shortest possible longshore length and minimum height while providing maximum protection. In addition, costly anchoring systems and durability of construction materials reduce the effectiveness and feasibility of designs other than a rubble-mound structure.

Generally, each of these alternatives, 1 through 4 is designed to provide solutions to distinct problems regarding commercial navigation in Corea Harbor. Each of these alternatives makes varying contributions to the study objectives. While each alternative is considered to be a separate measure to provide for some of Corea's navigation needs, no improvement alternative on its own is sufficient to meet all of the study's defined objectives. For this reason, a further discussion on the feasibility of each alternative, and combinations of them, follows below:

As discussed above, Alternatives 1 and 2 when combined would provide for additional anchorage basins totalling approximately three acres. Such an improvement would allow for a reduction in vessel damages due to the presently overcrowded conditions in the existing anchorage and also for the introduction of four new lobster boats. As discussed in Appendix 5, if these anchorages were dredged in conjunction with an access channel (Alternative 2), it would then become possible for a finfishery to be developed at Corea Harbor. With either plan, and not the other, sufficient obstacles would exist to preclude establishment of the fishery.

Therefore, as this study has determined that both Alternatives 1 and 2 are feasible individually (see Appendix 5) and a combination of both improvement options would result in an increase in net project benefits while attaining the study objectives more fully, a combination of Alternatives 1 and 2 will be evaluated. Additionally combinations of these alternatives are discussed in Appendix 5 of this report in the section titled "Incremental Analysis."

Conclusions

Based upon evaluation of the degree to which each alternative attained the project objectives and conformed to the planning constraints, all of the alternatives, herein after referred to as Plans A, B, C, D and E have been selected for further evaluation (see Figure 4).

ASSESSMENT AND EVALUATION OF DETAILED PLANS

This section contains an analysis of the five improvement alternatives selected for detailed study. Evaluation of the alternatives is based on their attainment of the project planning objectives.

General Assessment and Evaluation of Impacts

The general impacts common to all four improvement dredging alternatives are evaluated below. Impacts of breakwater construction and those which are unique to each dredging alternative are assessed and evaluated in subsequent sections of this report.

Dredging Impacts - Dredging impacts cause both short-term and long-term impacts including temporary air, noise, and water pollution. The most serious potential impact is the destruction of lobsters within the harbor. To minimize this significant adverse impact, review of the harbor bottom will be undertaken prior to dredging. Should lobsters be present in sufficient quantities all attempts will be made to remove them before any dredging commences.

Long-term impacts of dredging include removal of existing benthic organisms from the harbor bottom, removal or alteration of marine habitats, and alteration of tidal currents.

The predominant marine species expected to be displaced by dredging Corea Harbor are polychaete worms and burrowing bivalves.

Because of the relatively coarse nature of the sediments to be dredged little sedimentation or turbidity is expected to occur. The turbidity generated from dredging should have an imperceptible impact on the polychaete worms and deposit feeding bivalve organisms. Any long-term impacts on these species will be mitigated by natural repopulation of much of the area disturbed by dredging.

The amount of dredging ranges from 14,350 cubic yards for Plan A to 30,900 cubic yards for Plan C.

Shoreline Impacts - None of the alternative dredging plans will impact Corea's shoreline.

Impacts on Navigation - At present, navigation in the harbor consists entirely of commercial lobster boats. Recreational boating in Corea is limited to an occasional transient craft.

Development of an improved navigation system would result in increased fishing activity centered in Corea. All of the plans discussed in this section will facilitate existing navigation, with the only disruption to navigation being the dredging equipment operating within the harbor.

Social and Community Impacts - The proposed alternatives will have significant beneficial impacts on the community's economy. Increases in the efficiency of resources devoted to fishing will in turn provide an economic stimulant to the local economy. Improvements would afford increases in harbor utilization and allow for the development of finfish operations. Realization of increased economics and inherent efficiency increases will enhance Corea's competitive position for these fisheries. Increase in employment in local boat-building and other marine-related activities will positively impact the community.

Economic Impacts - Economic impacts of the proposed alternatives have been evaluated by estimating the benefits and costs associated with each plan of improvement. The cost estimates are based upon consideration of numerous factors including the quantities of dredge material, mobilization and demobilization, equipment costs and wage rates.

Costs have been estimated using a 1980 price level and an interest rate of 7-3/8 percent. Detailed estimates of the cost of each plan of improvement are contained in Appendix 4.

Benefits of the proposed alternative have been based on the assumption that improvements will occur immediately with the associated benefits through fleet additions, transportation savings, reductions in lost fishing time and damages and increased landings to accrue upon completion of dredging.

For the purposes of determining the economic feasibility of each separate plan of improvement, benefits and costs have been developed using an interest rate of 7-3/8 percent. Comparison of the estimated annual costs and annual benefits, and a detailed explanation of the derivation of project benefits, are contained in Appendix 5.

Mitigation Requirements

Mitigation measures would include steps to control the temporary noise, air, and water pollution due to dredging equipment, and to remove lobsters from the harbor bottom should they be present in substantial quantities. Dredged material will be disposed of in such a way as to inflict minimum environmental damage and derive maximum benefits.

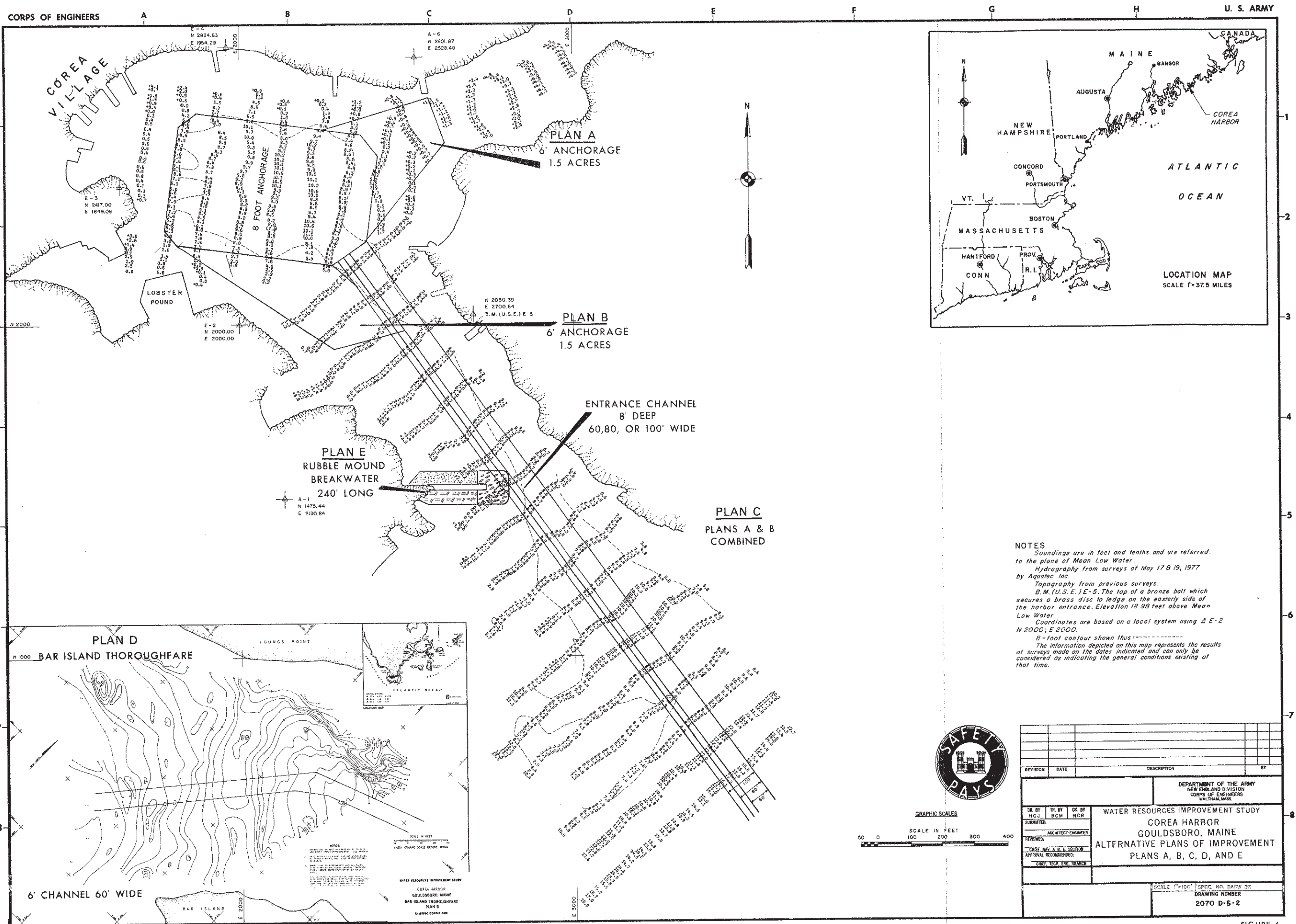


FIGURE 4

Implementation Responsibilities

Cost Allocation - One hundred percent of the cost of the project is allocated to harbor improvements. There are no other components in the Federal project beyond channel and anchorage improvements and the break-water construction.

Cost Apportionment - The Federal Government is responsible for 100 percent of the first cost of construction and 100 percent of the cost for all future maintenance as required. Federal costs vary for each of the alternatives.

Federal Responsibilities - The Federal project consists of general navigation improvements only and does not include any shore based facilities, shoreline protection, or site work at any land disposal areas.

Non-Federal Responsibilities - The specific local requirements as contained in the River and Harbor Act of 1960, as amended, are as follows:

(1) Provide, maintain, and operate without cost to the United States, an adequate public landing with provisions for the sale of motor fuel, lubricants and potable water, open and available to the use of all on equal terms.

(2) Provide without cost to the United States all necessary lands, easements and rights-of-way required for construction and subsequent maintenance of the project including suitable dredged material disposal areas with necessary retaining dikes, bulkheads, and embankments therefor.

(3) Hold and save the United States free from damages that may result from construction and maintenance of the project.

(4) Accomplish without cost to the United States alterations and relocations as required in sewer, water supply, drainage and other utility facilities.

(5) Assume full responsibility for all project costs in excess of the Federal cost limitation of \$2,000,000 under the Section 107 program.

(6) Establish regulations prohibiting the discharge of untreated sewage, garbage, and other pollutants into the waters of the harbor.

The following sections of this report consist of an assessment and evaluation of impacts which are specific to the individual alternative plans.

PLAN A

Plan Description

Plan A would entail the dredging of an additional 1.5 acres of anchorage area to a depth of 6 feet below mean low water in the area to the northeast of the existing Federal mooring basin.

Impact Assessment

Dredging Impacts - Plan A requires the removal of 14,350 cubic yards of material from an intertidal area of 1.5 acres in size.

Shoreline Impacts - The Plan A improvements do not result in any changes to the existing shoreline.

Impacts on Navigation - Since Plan A involves the construction of additional anchorage area within Corea Harbor, it would have a positive impact on commercial fishing operations which use the harbor. Smaller draft vessels, drawing less than six feet, would utilize the new additional mooring space thereby alleviating congestion in the existing eight foot (mlw) Federal basin and increasing the operational efficiency of the fleet.

Economic Impacts - Dredging disposal costs are based upon disposal at sea. If land disposal is required the estimated costs would be subject to change.

The estimated first cost for Plan A is \$168,300. The equivalent annual cost based on an interest rate of 7-3/8 percent is \$15,200. The annual project benefit is estimated at \$66,900.

Annual Cost and Benefits

<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>B/C Ratio</u>	<u>Net Benefits</u>
\$15,200	\$66,900	4.4	\$51,700

Evaluation and Trade-off Analysis

Plan A would provide additional mooring space sufficient to accommodate the existing fleet and allow for expansion of the commercial fishing fleet. The plans would not however allow for the diversification of commercial fishing operations, nor provide a greater degree of safe access to the harbor.

Cost Apportionment

Because the benefits associated with improvements at Corea Harbor are entirely accruable to commercial operations, the Federal share of the cost for Plan A is 100 percent, presently estimated at \$168,300.

Public Views

All public views expressed to date have been favorable with respect to increasing the size of the anchorage in Corea Harbor.

PLAN B

Plan Description

Plan B entails the construction of an eight foot deep access channel, 100 feet in width, extending from deep water for a length of 2,000 feet terminating at the existing Federal anchorage. The plan also includes the construction of 1.5 acres of anchorage area to a depth of six feet mlw in the area south of the existing Federal anchorage.

Impact Assessment

Dredging Impacts - Plan B requires the dredging of approximately 16,520 cubic yards of sand, gravel and mud, and the removal of approximately 2,670 cubic yards of ledge rock. Plan B requires dredging in an area which is at present entirely below mean low water, therefore, the plan would have no impact upon the intertidal zone. Blasting and rock removal would have a temporary negative impact on the immediate environment.

Shoreline Impacts - Plan B improvement does not result in any changes in the existing shoreline.

Impacts on Navigation - Plan B would have a substantial positive impact on navigation in Corea Harbor. The plan would provide the existing fleet easier and safer access to the harbor and allow for expansion of finfishing operations planned by local interest.

Economic Impacts - The initial cost of the Federal project for Plan B is estimated at \$582,400. The equivalent annual cost based on an interest rate of 7-3/8 percent is \$47,800. The annual project benefit is estimated at \$78,000.

Annual Cost and Benefits

<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>B/C Ratio</u>	<u>Net Benefits</u>
\$47,800	\$78,000	1.6	\$30,200

Evaluation and Trade-off Analysis

Plan B would provide a greater degree of safety as it would allow for two-way traffic at all stages of the tide. The plan would also permit additional anchorage area in the southern extremities of the harbor to sufficiently accommodate the existing fleet and allow for expansion of the

commercial fishing fleet. Plan B, however, would not allow for diversification of commercial fishing operations within the harbor.

Cost Apportionment

Because the benefits associated with improvements at Corea Harbor are entirely accruable to commercial operations, the Federal share of the costs of improvements in Plan B is 100 percent, presently estimated at \$582,400.

Public Views

All public views expressed to date have been favorable with respect to increasing the size of the anchorage in Corea Harbor and dredging an entrance channel to the harbor.

PLAN C

Plan Description

Plan C consists of an access channel eight feet deep and 100 feet wide extending from deep water for a distance of approximately 2,000 feet to the existing Federal anchorage basin. In addition, the existing anchorage would be expanded 1.5 acres in the northeast and 1.5 acres in the southwest. The additional three acres of mooring would be six feet deep at mlw.

Impact Assessment

Dredging Impacts - Plan C requires the dredging of approximately 30,900 cubic yards of sand, gravel, and mud, and the removal of approximately 2,670 cubic yards of ledge rock. A total of 1.5 acres would be removed from the intertidal zone to construct the northeast anchorage extension (Plan A).

Shoreline Impacts - Plan C would not result in any changes in the existing shoreline.

Impacts on Navigation - Plan C would combine both the negative and positive impacts associated with Plans A and B. The plan would provide easier and safer access to Corea Harbor for the existing fleet and would alleviate crowded conditions within the present mooring basin thereby increasing the efficiency and safe navigation of the fleet. The additional three acres of anchorage area would also provide room for the expansion of the fleet and allow for the introduction of finfishing operations.

Economic Impacts - The estimated first cost for Plan C is \$681,900. The equivalent annual cost based on an interest rate of 7-3/8 percent is \$56,600. The annual project benefit is estimated at \$144,900.

Annual Cost and Benefits

<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>B/C Ratio</u>	<u>Net Benefits</u>
\$56,600	\$144,900	2.6	\$88,300

Evaluation and Trade-off Analysis

Plan C combines all of the impacts, both negative and positive, of both Plans A and B. The negative effect on the intertidal zone is limited to those impacts described in Plan A. By removing the ledge rock and dredging the entrance channel first, the negative impact of dredging the anchorage areas on water quality within the harbor during construction can be lessened, since the widened channel will provide for more effective tidal flushing of the harbor. Plan C provides all the additional mooring space necessary to alleviate overcrowding in the harbor and provide room for expanded commercial fishing operations. Plan C will also allow for diversification of the commercial fishing operations in Corea Harbor through the introduction of finfishing boats.

Cost Apportionment

Because the benefits associated with improvements at Corea Harbor are entirely accruable to commercial operations. The Federal share of the cost for Plan C is 100 percent, presently estimated at \$681,900.

Public Views

All public views expressed to date have been favorable with respect to increasing the size of the anchorage and dredging an entrance channel in Corea Harbor.

PLAN D

Plan Description

Plan D involves the dredging of a thoroughfare between Bar Island and the mainland to the east of Corea Harbor. The channel would be approximately 400 feet in length, with a width of 60 feet.

Impact Assessment

Dredging Impacts - Plan D entails the dredging of 8,950 cubic yards of sand, gravel and mud, and the blasting and removal of 1,450 cubic yards of ledge rock. Plan D involves the removal of approximately 0.3 acres from the intertidal zone.

Shoreline Impacts - Plan D improvements do not result in any changes in the existing shoreline.

Impacts on Navigation - Plan D would provide more efficient access to and utilization of Corea Harbor by vessels which operate in the fishing grounds to the east, by a reduction in transportation time and costs. At present, vessels wishing to enter Gouldsboro Bay by this route must wait for higher stages of the tide. This route is preferred because of the degree of protection from wind and waves offered by the islands as opposed to the westerly route which is more exposed to high seas causing delays and making navigation to and from Corea Harbor difficult.

Economic Impacts - The estimated first cost for Plan D is \$323,900. The equivalent annual cost based on an interest rate of 7-3/8 percent is \$28,500. The annual project benefit is estimated at \$14,500.

Annual Cost and Benefits

<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>B/C Ratio</u>	<u>Net Benefits</u>
\$28,500	\$14,500	0.5	0

Evaluation and Trade-off Analysis

The annual costs associated with Plan D are in excess of the annual benefits which would be derived from construction of the thoroughfare. Construction of the channel would also restrict access to Bar Island which at present is gained by walking across the connecting sandbar at low tide. Approximately 150-200 people a year utilize this privately-owned island as a recreational area. Access to the island would be limited to boaters if Plan D were constructed. Since the plan does not provide net economic and/or environmental benefits, it cannot be recommended for Federal implementation.

Cost Apportionment

Since the plan cannot be recommended for Federal construction, the Federal Government cannot contribute funding for this plan.

Public Views

In regard to this proposed plan, there have been no negative responses from residents, however, several non-residents have expressed negative responses to dredging the channel because it would limit access to Bar Island.

PLAN E

Plan Description

Plan E would involve the construction of a rubble mound breakwater at the west side of the entrance to Corea Harbor. The structure would be built on top of a ledge and would connect to the shore at its western end.

The breakwater would be approximately 240 feet in length, and would be designed to restrict waves which would exceed ten feet above mean low water.

Impact Assessment

Construction Impacts - The construction of the breakwater as defined in Plan D would provide some degree of protection for vessels moored in Corea Harbor from wind and large waves entering the harbor from the south. Construction operations would have a temporary adverse impact on commercial fishing operations since some use of the existing channel would be required for use by construction equipment.

Shoreline Impacts - Plan E will have a minor impact on the western shoreline of Corea Harbor since the breakwater is connected to the shore at its western end. This design would inhibit the natural flushing of the harbor by the tides since the proposed structure would narrow the harbor's outlet to the ocean. Lessening the degree of flushing of the harbor will have a negative impact on water quality within the harbor and may also contribute to a build up of ice in the harbor in the winter which would present a hazard to navigation.

Impacts on Navigation - The breakwater proposed in Plan E would aid navigation within the harbor in times of severe storms, but may negatively impact on navigation within the channel and harbor during the winter by restricting the flushing of ice from the harbor.

Economic Impacts - The estimated first cost for Plan E is \$322,400. The equivalent annual cost based on an interest rate of 7-3/8 percent is \$28,300. The annual project benefit is estimated at \$20,000.

Annual Cost and Benefits

<u>Annual Costs</u>	<u>Annual Benefits</u>	<u>B/C Ratio</u>	<u>Net Benefits</u>
\$28,300	\$20,000	0.7	0

Evaluation and Trade-off Analysis

The annual costs of Plan E exceed the benefits derived from construction of the breakwater. Plan E also has several permanent negative impacts within the harbor due to restricted tidal flushing and the possible build-up of ice within the harbor in the winter. Since the plan does not provide net economic and/or environmental benefits, it cannot be recommended for Federal implementation.

Cost Apportionment

Since the plan cannot be recommended for Federal construction, the Federal Government cannot contribute funding for this plan.

Public Views

Public views associated with construction of a breakwater at the western side of the entrance to Corea Harbor are favorable.

COMPARISON OF DETAILED PLANS

In general, because of the degree of overcrowding of vessels in the existing basin, and the limited area available for dredging due to extensive ledge, there is a direct correlation between benefits and the amount of dredging. While both Plans A and B provide some degree of relief from overcrowding in the harbor, neither plan by itself provides sufficient anchorage area for vessels expected to use Corea Harbor as a result of the locally planned expansion of commercial finfishing operations. Plan A also does not contain provisions for enlarging the natural channel to provide for safe passage of Corea vessels at all stages of the tide.

Plan C, combining the positive factors of both Plans A and B, generates commercial lobster and finfishing operations. Plan A also does not contain provisions for enlarging the natural channel to provide for safe passage of Corea vessels at all stages of the tide.

Plan C, combining the positive factors of both Plans A and B, generates the greatest benefits, meets all of the planning objectives, complies with the planning constraints, and ameliorates Corea Harbor's dependence on the commercial lobster industry.

Plan D, developed to permit more efficient and safer access to the fishing grounds located east of the harbor does not generate a sufficient amount of benefits to offset the annual charges accruable to the implementation and maintenance of this plan.

Plan E, was developed to restrict wave heights within the harbor and decrease the damages resulting from winds and waves. As with Plan D, Plan E does not generate a sufficient amount of benefits needed to economically justify implementation of this plan.

COST COMPARISON

The following chart compares the cost of the five plans considered in detail. The chart also lists the annual charges associated with each detailed plan. In developing these annual charges, a Federal cost of 7-3/8 percent over a 50-year project life or recovery period was used.

COST OF DETAILED PLANS

	<u>PLAN A</u>	<u>PLAN B</u>	<u>PLAN C</u>	<u>PLAN D</u>	<u>PLAN E</u>
Construction	\$147,700	\$507,800	\$595,100	\$275,500	\$282,200
Engineering & Design	10,300	35,300	41,400	19,200	19,600
Supervision & Administration	10,300	35,300	41,400	19,200	19,600
Aids to Navigation	0	4,000	4,000	10,000	1,000
Total Estimated First Cost	\$168,300	\$582,400	\$681,900	\$323,900	\$322,400

ANNUAL CHARGES

	<u>PLAN A</u>	<u>PLAN B</u>	<u>PLAN C</u>	<u>PLAN D</u>	<u>PLAN E</u>
Interest and Amortization	\$12,800	\$44,200	\$51,800	\$24,600	\$24,500
Annual Maintenance	2,400	3,600	4,800	3,900	3,800
Total Annual Cost	\$15,200	\$47,800	\$56,600	\$28,500	\$28,300

BENEFIT COMPARISON

As mentioned previously, Plans A, B and C would generate benefits higher than the annual costs needed to implement and maintain the items within the plan. A detailed discussion of benefits is given in Appendix 5. However, a summary breakdown of annual benefits and their comparison with annual charges is provided on the following chart.

ANNUAL BENEFITS

	<u>PLAN A</u>	<u>PLAN B</u>	<u>PLAN C</u>	<u>PLAN D</u>	<u>PLAN E</u>
Prevention of Damages while moored	\$9,600	N.A.	\$9,600	N.A.	\$9,600
Reduction of Lost Fishing Time	10,400	N.A.	20,400	N.A.	10,400
Increased Lobster Landing	38,700	N.A.	38,700	N.A.	N.A.
Increased Scallop Landing	8,200	N.A.	8,200	11,100	N.A.
Transportation Savings	N.A.	30,000	30,000	3,400	N.A.
Future Finfishing Landings	N.A.	48,000	48,000	N.A.	N.A.
Total Annual Benefits	\$66,900	\$78,000	\$144,900	\$14,500	\$20,000

N.A./Not Accruable

ECONOMIC IMPACTS

	<u>PLAN A</u>	<u>PLAN B</u>	<u>PLAN C</u>	<u>PLAN D</u>	<u>PLAN E</u>
Benefit/Cost Ratio	4.4 to 1	1.63 to 1	2.6 to 1	0.5 to 1	0.7 to 1
Net Benefits	\$51,700	\$30,200	\$88,300	0	0

Environmental Comparison

Of the three harbor dredging plans, Plan B minimizes environmental impacts since the areas to be dredged all presently lie below mean low water and are not within the intertidal zone. Plan B also entails enlarging the natural channel dimensions increasing the degree of tidal flushing of the harbor. The removal of 1.5 acres of intertidal zone as in Plan A is also contained in Plan C. Plan C, however, entails the channel dredging and associated tidal flushing benefits and is therefore considered to have only negligibly greater environmental impacts than Plan A.

Neither Plans D or E have any associated environmental benefits. Both plans involve removal of 0.3 acres of intertidal zone. Plan D would have an adverse impact on water quality within the harbor as it would restrict tidal flushing. Plan E involves a large amount of blasting and ledge habitat removal.

COMPARISON SUMMARY

Table 1, entitled "System of Accounts" is a general analysis relevant to plan selection. It presents the determinative factors that underlie each final alternative by displaying the significant beneficial and adverse impacts. This system is utilized for the purpose of trade-off analysis and final decision making.

Rationale for Designation of NED Plan

Plan C is the alternative which maximizes net economic benefits. Net economic benefits are maximized when plan scale is optimized and the plan is efficient. Scale is optimized when the benefits of the last increment of output for each measure in the plan equals the economic costs of that increment. A plan is efficient when the outputs of the plan are achieved in a least cost manner.

Thus, for Corea Harbor, the plan that most efficiently optimizes scale is the one that affords an adequate navigation system at the least cost. This would be the NED plan, and for Corea Harbor it is Plan C.

Rationale for Designation of EQ Plan

In designation of the environmental quality or EQ plan, it is recognized that environmental quality has both natural and human manifestations. Beneficial EQ contributions are made by preserving, maintaining, restoring, or enhancing the significant cultural and natural environmental attributes of the study area.

The present environmental quality of Corea Harbor is good. The waters of the harbor are considered safe for all forms of recreational activity. The good water quality of the harbor is most likely a result of the harbor's geographic isolation from populous regions as well as a 10.5 foot tidal range which serves to flush the harbor of pollutants. Consequently, in looking at detailed alternative plans, the EQ plan would be the one that has a beneficial impact or the least negative impact on existing harbor conditions and as a result, the least potential impact on the harbor environment.

In looking at the alternative plans considered in this study, the plan which would have the least impact on the harbor is Plan B. Dredging of the anchorage basin to the southwest of the existing anchorage would not entail the removal of any intertidal zone. It is designated the EQ plan.

Rationale for the Selected Plan

Plan C is the selected plan. It provides the maximum net benefits. While its environmental impacts are greater than Plan B, they are not significantly greater than Plan A. Both Plans A and C involve the removal of the same area of intertidal zone. Plan C enhances the social well being by affording greater benefits and minimizing navigation hazards and delays. Because of the limited area available within the harbor Plan C is the only plan which provides for future commercial growth of the Corea Harbor fishing industry.

RECOMMENDED PLAN

The recommended plan as shown on Figure 5 would provide Corea Harbor with an access channel 8 feet deep and 100 feet wide, extending from deep water to the anchorage basin, a distance of approximately 2,000 feet. In addition, the existing 5.5 acre anchorage would be expanded 1.5 acres to the northeast and 1.5 acres to the southwest. The additional three acres of anchorage would be 6 feet deep at mlw.

The total construction investment for the recommended plan is estimated to be \$681,940. Annual benefits to the commercial fishermen, amount to \$144,900 which when compared to annual charges of \$56,600 yield a benefit-cost ratio of 2.6 to 1.

TABLE 1

SYSTEM OF ACCOUNTS

	Without Project	Plan A N.E. Anchorage	Plan B South Anchorage Entrance Channel	Plan C (Plans A & B)	Plan D Bar Island Thoroughfare	Plan E Breakwater
A. Description						
B. Impact Assessment						
1. NED						
a. Annual benefits		\$66,900	\$78,000	\$144,900	\$14,500	\$20,000
b. Annual construction cost		\$12,800	\$44,200	\$ 51,800	\$24,600	\$24,500
c. Annual maintenance cost		\$ 2,400	\$ 3,600	\$ 4,800	\$ 3,900	\$ 3,800
d. B/C ratio		4.4 to 1	1.6 to 1	2.6 to 1	.7 to 1	.7 to 1
e. Net benefits		\$51,700	\$30,200	\$ 88,300	0	0
2. EQ						
a. Intertidal zone removal (AC)	0	1.5	0	1.5	0.3	0.3
b. Dredging impacts on water quality	-	(4)	(2)	(3)	(1)	-
c. Shoreline impacts (breakwater) (1.f.)	-	0	0	0	0	100
3. SWB						
a. Safety for commercial vessels	No	(3)	(2)	(1)	(5)	(4)
b. Minimizes impacts on recreational areas	-	Yes	Yes	Yes	No	Yes
4. RD						
a. Employment and commercial growth Project RD rank	Negative -	Positive (3)	Positive (2)	Positive (1)	Positive (5)	Positive (4)
C. Plan Evaluation						
1. Contribute to Planning Objectives and Criteria						
a. Provides for safe utilization of Harbor facilities and navigation	No	Yes	Yes	Best	Yes	Yes
b. Accommodates existing fleet and expected future vessels	No	No	No	Yes	No	No
c. Consistent with State, local and regional goals for commercial fisheries	-	Yes	Yes	Yes	Yes	Yes
D. Public Response						
a. Plan found acceptable	No	Yes	Yes	Yes	Yes	Yes
E. Implementation Responsibility						
a. Federal share (%)	-	100	100	100	NOT RECOMMENDED FOR IMPLEMENTATION	
b. Local share (%)	-	0	0	0		

ENVIRONMENTAL ASSESSMENT

Introduction

In keeping with the National Environmental Policy Act of 1969, the New England Division Army Corps of Engineers has examined environmental values as part of the planning and development of the proposed action plan. Background environmental information was compiled for proposal of this report through interviews with various State and local interest groups and a search of published literature. This report provides a preliminary assessment of environmental impacts and alternatives considered and contains other applicable data to the Section 404 Evaluation requirements.

Existing Conditions

The present 5 1/2 acre anchorage was adequate for the 35 or so boats that operated out of Corea Harbor until the early 1970's, when the number of moorings steadily increased to 40 permanent boats and 45 to 50 at certain times of the year. As an additional consideration, the recently enacted protection of U.S. territorial waters, up to 200 miles offshore, has resulted in a supply of finfish. This has created a demand for mooring facilities for 55 foot and longer boats. Corea Harbor is in an excellent location from which to operate finfishing boats, but there is presently no room in the anchorage for such boats.

The channel which leads from the open sea to Corea Harbor is sufficiently wide and deep under all but the lowest drain tide conditions to allow in or out traffic, except for one small area. In this area, near the midpoint of the channel, a rock formation narrows the channel so that boats cannot safely pass during periods of low tide. Thirty-five ft. lobster boats are denied safe passage for about three hours per day while 55 ft. finfishing boats would be denied safe passage five or six hours per day. Even when the channel can be safely negotiated, there is still a problem getting safely to Gouldsboro Bay, a prime fishing area, during periods of high seas.

Aside from the problem of safe passage into and out of Corea Harbor, high seas cause an additional problem during the two hours preceeding and following high tide. When the tide is lower than this, waves from the open ocean are caused to break before entering Corea Harbor by a ledge formation located on the south side of the harbor entrance. During periods of high tide, however, these ledge formations are too deeply submerged to cause the waves to break, thus, they roll all the way into the mooring area, often causing damage to boats.

Alternatives Including the Proposed Action

In considering the protection and navigational needs of the existing and future commercial fleet at Corea Harbor the following alternative plans of improvement were evaluated.

PLAN A

- Northeast anchorage extension - dredge an additional 1.5 acres of mooring to a depth of 6 feet below mean low water. This would entail excavation of 14,350 cubic yards of dredge material.

PLAN B

- Dredge certain areas in the entrance channel so that the entire channel will be at least 8 feet deep throughout its entire length, 100 feet wide and expand the southwest corner of the anchorage area by 1.5 acres.

PLAN C

- Plans A and B combined. Total estimated amount of sediment to be dredged is 2,670 cubic yards of rock and 30,900 cubic yards of unconsolidated sediments. A total of 3.5 acres of intertidal and subtidal marine bottom habitat will be altered. Similar substrate types will remain however, upon completion of the dredging operation. Therefore, the integrity of the indigenous biotic commodities will be maintained by reproduction from surrounding areas.

PLAN D

- Bar Island Thoroughfare - The dredging of a channel, 6 feet below mean low water, 60 feet wide through the area connecting Bar Island with the mainland. This would entail dredging an estimated 8,950 c.y. of sand, gravel, and mud and blasting and removal of 1,450 c.y. of rock. A total of 0.3 acres of intertidal zone will be altered.

PLAN E

- The construction of a breakwater to protect Corea Harbor from storm waves, especially from the southwestern direction.

No dredging is anticipated for the construction of the breakwater. A rubble breakwater structure could provide a beneficial effect to the local marine communities by affording new and diverse habitat features not found in a natural sedimentary bottom area. The obvious impact with this proposal is the substitution of an infaunal community with epibenthic plant and animal populations and unconsolidated sediment with a stable rock surface characteristic of the coastline.

No Federal Action Plan

If no Federal action is taken the Corps of Engineers will continue periodic maintenance dredging in the existing anchorage on an "as needed basis." Conditions of overcrowding with its attendant damages and navigation safety problems described in the previous section will remain. From the national environmental viewpoint if there is no project there will be no environmental impacts. From the viewpoint of man's environment the two most important impacts will involve economics associated with damages and limitations on experience of present bales facilitates as it relates to commercial fishing activities and the aspect of safe navigation.

Proposed Action

The proposed plan of improvement as shown in Figure 5, is Plan C (combined Plans A and B), and consists of the following:

- Provision for an additional one and one-half acres to be dredged from the tidal flat in the northeast corner of the harbor.
- An additional one and one-half acres would also be dredged from the southerly side of the mooring area.
- Dredge selected areas in the entrance channel to at least 8 feet throughout its entire length and 100 ft. width.

The dredging will be performed under a private contract with the Government. The quantity to be dredged is estimated at 30,900 cubic yards of sediment and 2,670 cubic yards of rock. A bucket or clamshell dredge will be employed and disposal of the dredgings will be transported to two open-water dump sites. The rock will be deposited in the immediate vicinity of the Whistle Buoy southwest of Western Island. The rest of the material will be dumped at an area approximately one nautical mile south of Outer Bar Island the center of which is located at the indices of 1H3-1944 and 1H7-1114 LORAN A coordinates. Water depth at this site is 97 feet. This general area was used for disposal of material dredged during maintenance operations in 1953. Benthic dredge samples and current velocities and direction were obtained to characterize the proposed disposal site and satisfy EPA's 103 and 404 site selection/designation evaluation criteria (para. 228.4-228.6 Fed. Register, 11 Jan. 1977). The contractor will be required to place a marker buoy at the center of the disposal site to facilitate accuracy of the disposal operations. A Corps inspector will be assigned to witness each dump.

Alternative Methods of Dredging

The method of dredging used depends on the method of disposal chosen. If ocean disposal is selected, a mechanical (bucket, clamshell) dredge will be used. If diked disposal in some nearby area is chosen, then a hydraulic dredge will be used. In the case of diked disposal at a more distant site, a mechanical dredge would be used. Thus, there are a few real choices once the choice of disposal method has been made.

Alternative Disposal Methods and Possible Sites

Each of the possible disposal methods would have some environmental impact, whether in the ocean, on land, or in diked disposal areas near the waterfront. It is difficult to offset the impacts under such widely varying conditions against each other. The major concerns in ocean disposal of dredged materials are potential for impact on identified commercial marine resources and potential for addition to general, low-level deterioration of the overall ocean resource. Only the former can be specifically addressed. Based on the results of sediment analyses, the majority of the material is of coarse grain size which is acceptable for open water disposal under current 404 Dredged Material Disposal guidelines.

The question of a disposal area for the dredged material has been investigated in detail.

The following land and ocean sites have been identified by local interest for potential disposal of the dredged material.

- Site 1L, as shown in Figure 6, is an area at which the town of Gouldsboro has been contemplating constructing a public landing for some time. The dredged material would be used as fill. This site is located adjacent to a small estuary formed by the inlet of a small stream into Gouldsboro Bay. The site which the town of Gouldsboro wishes to develop is a marshy area which would have to be built up in order to allow vehicular traffic to launch boats, park and provide for associated facilities.
- Site 2L, as shown in Figure 7, is a State approved sanitary landfill owned and operated by a private individual, Daniel Mitchell, of Gouldsboro. The dredged material would be used as intermediate cover at this site.

The unit cost for trucking the dredged material to either site is estimated to \$0.75/cy. Site 2L would require a larger transport distance than Site 1L, 8.2 miles as opposed to 6.7 miles but the cost for trucking is estimated to be the same. Land disposal would require the use of a hydraulic pipeline dredge and stacking area close to the harbor where the materials can drain, dry and consolidate before trucking. Considering the nature of the sediments to be dredged the problems of oozing or spillage during transport is not envisioned to be significant. The costs to transport the material from the dredging site to shore is estimated at \$3.25/cy but the cost for placement of the material at the public landing site (Site 1L) is estimated to be higher (\$0.47/cy.) than at the sanitary landfill site (no cost). Site 1L may also be subject to local and State wetlands regulations.

Ocean Disposal Sites

Two general open water areas have been identified (Figure 8) as possible disposal purposes:

Site 1S - Whistle Buoy outside of Western Island. This site would be used for rock material only and is in keeping with the basic ecological principle of depositing like material together which will facilitate recolonization and stability of marine species populations.

Site 2S - An area approximately 3/4 miles southeast of Outer Bay Island used in 1953 when maintenance dredging of the harbor was last performed. Specific coordination of this disposal area were not given in the original project contract specifications. There is commercial fishing in this area for scallops, halibut, flounder and lobster, but the fishermen felt that the disposal operations would not interfere providing some simple disposal procedures (i.e., setting a marker buoy and point dumping) are adhered to (Chase, 1978).

The cost for depositing dredged material at any one of the ocean dumping sites was estimated to be equal, (\$90,000 for 30,000 yards), as shown in Appendix 5 of this report. This cost was calculated from the estimate of \$3.00/c.y. for the dumping barge and its movement back and forth between the dredge site and the disposal site. The difference in distance hauled between ocean sites #1S and 2S is not considered significant.

Environmental Consequences and Probable Impacts

Harbor Sediments

The Army Corps of Engineers obtained three (3) sediment core samples in 1974 from within the Federal anchorage area. The sediments were visually classified as gray organic fine clayey silt or silt with a hydrogen sulfide odor. The percentage of fine materials characterizing these sediments is high and averaged 85 percent. The carbon content showed a 3.98 percent average which is indicative of the high organic composition. The material in this area will not be dredged under the proposed action plan.

Three additional area samples were taken in 1978 from areas 1 and 2, the anchorage improvement or extension areas being considered by this study (see Figure 9). The sediments along the western side of the channel are classified as gray sand and silty-sand. Divers also reported gravel and rock in this area. The material at the creek mouth (area 1 northeast corner) PE-1 1978, is comprised of gray gravelly sandy organic silt. Deeper probings completed in 1959 as part of the original survey report study reveal underlying hardpan and sand (U.S. Army Engr. 1959). The

results of bulk chemical testing of the sediments are summarized in Table 2.

According to the 404 guidelines for the discharge of dredged or fill material (Fed. Register, 5 September 1975, para 230.4 (b)(1); (Fed. Register, 18 September 1979, para 230.22) and Title 40, Sect. 103 of the Marine Protection Research, and Sanctuaries Act of 1972 (Fed. Register 11 January 1977, para 227.12) the materials proposed to be dredged are suitable for open water disposal. Therefore, further evaluation of the chemical, biological, interaction effects, specifically elutriate and bioassay/bioaccumulation tests is not necessary because the sediments meet the following exclusion criteria:

(i) Composed predominantly of sand, gravel or any other naturally occurring sedimentary material with particle sizes larger than silt...

(ii)(a) The site from which the material proposed for discharge is to be taken is sufficiently removed from sources of pollution.

(b) Adequate terms and conditions are imposed on the discharge of dredged fill material to provide reasonable assurance that the material will not be moved in currents or is otherwise damaging to the environment outside of the disposal area.

Offshore Disposal Area Sediments

An attempt was made in July 1978 to obtain sediment samples from the proposed ocean disposal area southeast of Western Island (Site 1S). Five locations were occupied ranging in depth from 17-20 fathoms and a spring powered Ship grab sampler was used. The bottom substrate at all stations consisted of hard packed silty sand and gravel with small stone and a relatively high quantity of shell. Additional samples were collected December 1978 and January 1979 by scuba divers in order to complete bulk chemical analysis. The results of these tests are given in Table 3. Generally speaking the heavy metal values for the harbor sediments fall within the concentration range of the offshore sediments. Station PE-1 from the creek mouth exhibits higher parameter concentrations than those offshore but these values coincide with the overlying silt accumulation which is restricted to only the upper one foot or one and one-half foot level. As mentioned earlier probings have identified sand beneath this organic silt cover. The parameter values for the Corea Harbor sediments when compared to data from other Maine projects show that the levels fall within the range of average values for sediments characterizing other state coastal harbors.

Current Measurements

Near bottom current velocities were monitored for at least 30 days at two locations in the vicinity of the proposed ocean disposal site.

The mooring locations were Latitude 44°23.45'N and Longitude 67°56.03'W at Mooring A, and Latitude 44°23.25'N and Longitude 67°56.88'W at Mooring B, both in approximately 90 feet of water (Figure 10). Mooring B is in the immediate location of the proposed disposal area as previously described in Section 1, para. 1.05.

Current speeds were low at Mooring A, southeast of Sally Island, with 49.8 percent of the speeds below threshold, 0.06 kn. The predominant directions of flow were east-northeast and northeast (22.5 to 45.0°M), with mean speeds of 0.14 kn (7.21 cm/sec) and 0.13 kn (6.69 cm/sec) respectively. The highest speed recorded during the entire sampling period was 0.50 kn (25.75) toward the northeast (52°M) on March 12, 1979. Rose diagrams of the current meter data are shown on Figure 11.

Current speeds at Mooring B, as shown in Figure 12 southeast of Western Island and Outer Bay Island, were slightly higher than those observed at Mooring A (Figure 13). Sixteen and two tenths percent of the readings were below threshold. The predominant directions of flow were east-northeast, northeast and east (22.5 to 90°M). Highest mean speeds were toward the ENE, 0.21 kn, the NE, 0.17 kn (8.74 cm/sec) and the E, 0.18 kn (9.27 cm/sec). The highest speed measured at Mooring B was 0.48 kn (24.7 cm/sec) toward the east on March 16 and 28, 1979. These mean velocities are not great enough to erode or transport silty sediments; however, during periods of gale winds or hurricane storm conditions the fine fraction of the disposed materials will be winnowed and resuspended. Trawling and commercial scallop dredging operations will also redistribute the sediment if towed through the dump area.

The current meters at Moorings A and B operated simultaneously during the period March 9 to 16, 1979. Current speeds at Mooring B were slightly higher than at A during this time. Flows at B were more northerly than at A. In general current flows paralleled the bottom contours at both sites.

Benthic Biology

Samples taken at five shallow water subtidal harbor stations, shown in Figure 14, showed the sediment composition to be an organic rich, fine black mud. Hydrogen sulfide odor was noticeable in all samples except those collected at Station 1. Sediments at this station were more sandy.

Numbers of species and individuals varied considerably both between replicates and between stations. Station 1 had the most species and Station 5 had the most individuals. Station 2 was the most depauperate of these samples in both categories. Polychaetes were numerous and often dominant. Capitella capitata, Prionospio sp., Streblospio benedicti, Spio filicornis, Nehptyidae juveniles and Microphthalmus sp. were the most common. At Station 5, a gastropod, Hydrobia totteni, was also abundant. The (soft-clam) Mya arenaria, was rare or absent at all stations.

Summaries of species lists and counts from the five harbor stations are shown in Table 4.

Exploratory dredge hauls in the offshore disposal area revealed substrates at the five stations sampled were a hard flat bottom generally covered with gravel, small rounded rocks and much scallop and Arctica shell fragments. Visual observations by divers at Station 3 and 5 indicated that the area is probably influenced by bottom currents, since there is little buildup of fine sediment. Offshore station locations are shown in Figure 15.

Fauna collected at these stations was characteristic of rocky bottoms with many sessile colonial and other attached species present. Highly diverse communities were present at all times. Scallops, Placopecten magellanicus, were observed at all stations in small numbers. Table 5 is a listing of species collected from the epibenthic dredge haul.

Impacts of Dredging

Most of the benthic fauna located in the path of the dredge will be destroyed. Organisms most likely to be affected this way will include polychaete worms and burrowing bivalves. Motile organisms such as rock crabs, shrimp, lobster, and finfish would be able to evade the dredge. Because of the relatively coarse nature of the sediments to be dredged little sedimentation or turbidity is expected to occur. The turbidity generated from dredging should have an imperceptible impact on the polychaete worms and deposit feeding bivalve organisms. Recolonization of the dredged area will eventually occur. Recolonization of areas impacted by dredging has been demonstrated within a period of approximately 1-1/2 years in Chesapeake Bay (Pfitzenmeyer, 1970).

Dispersion of sediments during dredging may facilitate release of inorganic and organic materials into solution. Laboratory studies by DMRP indicate that certain trace metals may be released in the ppb range while others show no release pattern. Soluble pesticides released into the water column are negligible (Fulk, et al. 1975; Chen et al. 1976). Since the greatest concentrations of heavy metals and other contaminants are known to be associated with silt-clay sediments little or no impact of such release would be predicted at the dredge site.

Disposal Impacts

The water quality associated impacts of dredge material disposal include increases in turbidity, suspended solids and release of metals and organic contaminants. Following discharge of a barge load of material, a turbidity plume was noted with the highest level of suspended solids at the bottom of the water column (New England Aquarium, 1975). The levels of turbidity observed were not found to adversely impact primary production. Additionally, increased levels of ammonia, lead, copper, and zinc

were noted in the plume. The copper and zinc concentrations were only two times over background levels but the lead in the plume had increased 30 times. The fate of these concentrations and decay rate were not explored.

In more detailed monitoring of dredged material disposal at the New London dumping grounds in Connecticut, suspended fines were increased following a dump but returned to background within one hour. Observations on dissolved oxygen levels ranged from no alterations in concentration to depressions of more than 50 percent lasting ten minutes. Surrounding waters were not impacted. Slight depressions were noted in pH and lasted from ten to thirty minutes, depending on the relation of the sampling site to the plume. No variations of Eh were noted in the plume or surrounding water. Return of volatile solids to background levels took as little time as 15-20 minutes for surface waters, and over two hours on the bottom of the dump site. Concentrations of trace metals in the water column showed no consistent trends that could be attributed to the disposal of the material. Monitoring of lobsters inhabiting the sediments at the disposal site for bioaccumulation showed (Naval Facilities Engineering Command, 1975) no clear evidence of accumulation.

In relation to the disposal of Corea Harbor material, it can be expected that there will be some minor release of oil and grease, volatile solids, suspended solids, nitrogen compounds, and some trace metals. The coastal marine sediments of Maine contain relatively high metal concentrations and vertical and horizontal trends would be difficult to identify. Another adverse impact likely to occur would be burial of organisms. Work by McCauley (1977) and Rhodes (1978) indicates, however, that recolonization of disturbed sites can occur within 4 weeks to 6 months of the cessation of disposal. From the current data it appears that the velocities recorded at the proposed disposal site are not great enough to cause significant movement of the dredged materials deposited there. Lobsters are known to be attracted to freshly deposited dredged spoils and Corea Harbor lobstermen indicated that catches were good during the last disposal operations.

Impacts of Blasting

Removal of ledge rock and boulders would require drilling and blasting with dynamite. The lethality of an explosive is directly related to its detonation velocity, charge weight and density of material to be blasted. Most explosive in a rock or clay substrate produces low level over pressures with, subsequent reduced lateral or vertical pressure charger. The confined nature and timing of the detonation will aid minimizing the overall impacts. Some mitigation measures that can be used include the use of warning charger (dynamite or pulsed electrical currents) outside the perimeter of the proposed work area to scare away any large fish schools or mobile invertebrate animals; scheduling of blasting to avoid peak periods of fish migration and spawning; and submerge the charges below the mud line which will buffer the pressure shock wave.

It is anticipated that the amount of blasting to be performed will not result in any significant loss of fish and lobster and would not significantly affect the food web or natural productivity of the immediate area. Further, no significant loss of habitat area would occur as a result of the proposed blasting activity.

Mitigation Measures

Important mitigation considerations which have been identified are:

1. To conduct the dredging operations at a time of the year when there are the least number of migratory species, primarily lobsters, in the dredging area.
2. To dispose of the dredged material in such a way as to:
 - a. Inflict minimum environmental damage.
 - b. Derive maximum benefit.

The area where the dredged material is placed for disposal should be one containing as limited an ecosystem as possible. This can be accomplished by buoying the site and point dumping. It must not be one serving as a habitat for one or more endangered species. It should contain as few commercially important species as possible and its geology should be compatible with the material being disposed. Moreover, the deposition of dredged material, whether on land or in the sea, should produce a benefit if at all possible. The placement of the rock material at the Whistle Buoy is thought to create an artificial reef or additional habitat for lobsters and other attached marine invertebrates. The use of this introduced substrate then by marine organisms is seen as a benefit.

Lobsters and other marine species are migratory, moving from one place to another according to reproductive cycles and schedules, water temperatures and other factors. With respect to Corea Harbor, lobsters are generally absent (there may be some animals over wintering in the bottom muds) during the months of November through April. Therefore, if dredging operations were conducted during this period of the year, effects on the lobsters would be minimized.

Disposal (Site B) of the sand and silt portion of the dredged material will be performed in waters of 90-95 feet and the site marked with a buoy for usable navigation reference. Disposition of rock at the Whistle Buoy (Site A) will be accomplished in such a way that a minimum depth of 40 feet (for navigation safety) exist over any of the piles.

Advance notice will also be given to local fisheries to remove or relocate any lobster holding cars out of the immediate area(s) of dredging and blasting. Barge tow routes will also be established prior to actual

operations and in coordination with the local fishing community. These precautions hopefully will minimize impacts to gear.

Affected Environment

Corea is one of seven villages which makes up the town of Gouldsboro, Maine. It is located in Hancock County and is southeast of Gouldsboro Bay. Geographically, the village is located 130 miles northeast of Portland, Maine and 55 miles southeast of Bangor.

The population of the town of Gouldsboro is approximately 1,500 permanent residents. During the summer months the population raised to about 2,500. The population of the village of Corea Harbor is approximately 220 people.

The harbor consists of a five and one-half acre anchorage, 600 feet long by 400 feet wide and about 8 feet deep at mean low water. There is an entrance channel, also about 8 feet deep at mean low water. The entrance channel is about 2,500 feet long, extending from the mouth of the harbor, formed by three islands and the mainland, to the anchorage.

Bar Island and Western Island form protective barriers on the easterly and southerly sides. To the southwest however, the harbor entrance opens relatively unprotected to the Atlantic Ocean.

Like many partially protected harbors along the Maine coast, Corea Harbor is vulnerable to storms during which winds blow from a certain direction, and is well protected from storms from other directions. The weather in the Corea Harbor area is typical of northeastern coastal areas, usually temperate but accented by occasional storms with winds up to 30-50 miles per hour. Ice presents a problem with coastal structures in the winter-time. The harbor does not normally freeze over, but large chunks of ice form which push and batter pilings, docking facilities, moorings and boats.

Development and Economy

The economy of Corea Harbor is centered around the fishing industry in general and lobstering constitutes a dominant portion of that industry. Clam digging and worming are major occupations of other villages within the town of Gouldsboro. Unemployment has been characteristically high, sometimes exceeding 12 percent.

The village of Corea consists of about 150 homes gathered around the harbor shore. Most of the residents are involved with the lobster fishing industry, which was established in the late 1800's. There is a well established Lobstermen's Co-op having 44 active members. The Co-op has a dock, bait house and lobster handling facilities located on the shore of the harbor. Also located on the periphery of the harbor, are a dozen

lobstermen's docks and a docking facility owned and operated by a boat builder.

Twelve piers are located around the periphery of the anchorage. These piers are typically 50-70 feet long, 10-12 feet wide and are used to store and work on lobster fishing gear. They are planked with wood and are supported on wood pilings. There are 46 permanent moorings within the anchorage, all of which are privately owned. The number of boats moored varies throughout the year from about 30 to 50.

Fisheries Resources

Lobster fishing is the mainstay of the economy. Three to four hundred thousand pounds are landed by Corea Harbor lobstermen annually, bringing a total retail value of one and a half million dollars with almost half a million dollars representing net profit to the lobstermen.

Lobster fishing is supplemented by a small scallop fishing industry. To date there has been very little finfishing out of Corea Harbor, due mainly to limited resources in the past, and the absence of accommodations for 55 foot and longer vessels. The monthly landings of lobsters for 1978 ranged from 2,926 lbs. to 53,144 lbs. The highest landings were made during the months of August through November when a total of 190,233 lbs. were recorded. Scallop landing for 1970 totaled 7,038 lbs for a five month period January through March and November through December.

Benthic Invertebrates

The occurrence of different populations of benthic organisms is generally related to bottom type. Mud silt bottoms are predominantly inhabited by organisms that burrow or inhabit various kinds of tubes (infauna). On hard bottom or rocky areas; organisms generally lie on the exposed substrate, attached on or under rock and shell (epifauna). Another way of describing the benthic fauna is in terms of the community. Certain groups of species occur together more or less consistently.

Dive observation (Chase, 1978, Schick, 1978) and information obtained from twenty grab samples have provided baseline data on the benthic invertebrate composition of Corea Harbor. A complete species list by solution is given in Table 4.

Hydrography

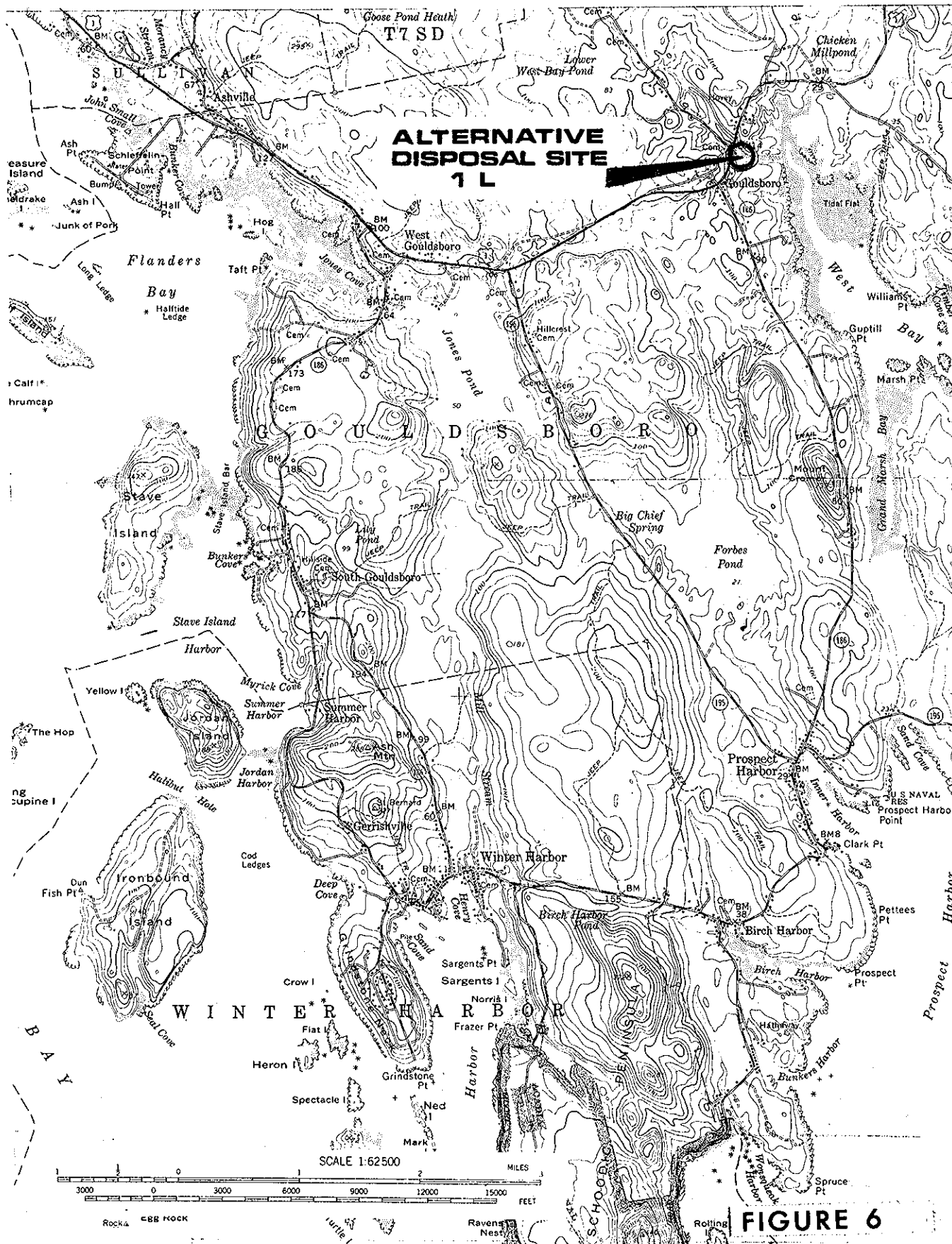
The tides at Corea are semidiurnal. The mean range of tide is 10.5 feet. At times a heavy surge is felt in the harbor, especially during winds from the southwest direction. Ice usually obstructs the inner harbor from December to March.

Historical-Archeological Features

The Maine Historic Preservation Commission has identified one significant archeological site near the proposed dredging sandbar area between Bar Island and the mainland (letter dated 31 October 1979). Specifically the Site #45-8 lies on the tip of Young's Point approximately 400 meters NWE of the center of Bar Island. Since all dredging activity will take place below mean high tide and no disposal is anticipated on land in this particular area there will be no effect on the site.

Endangered or Rare Species

The U.S Fish and Wildlife Service (letter dated 3 July 1979) was reported that they know of "no endangered or threatened species in the project area."



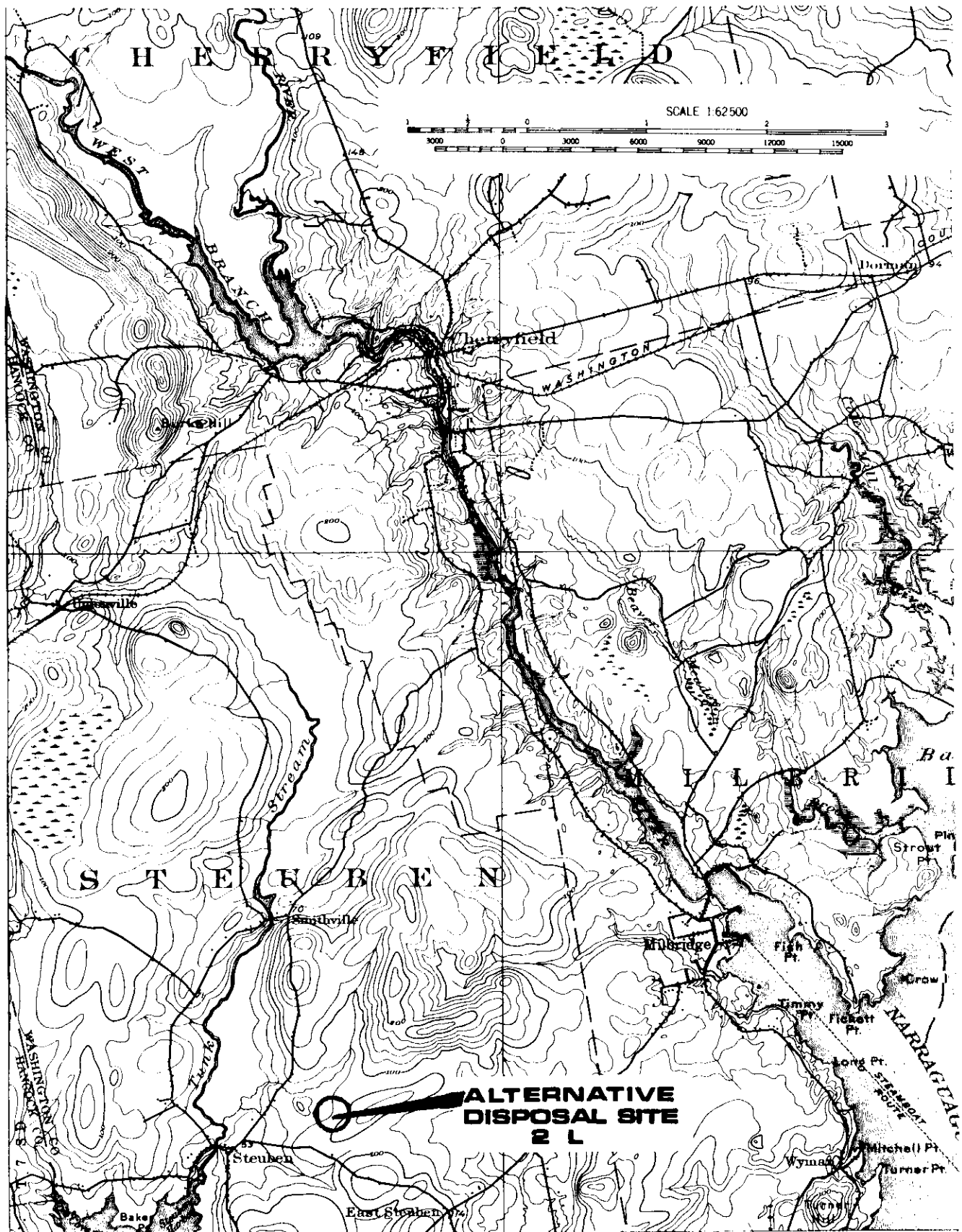


FIGURE 7

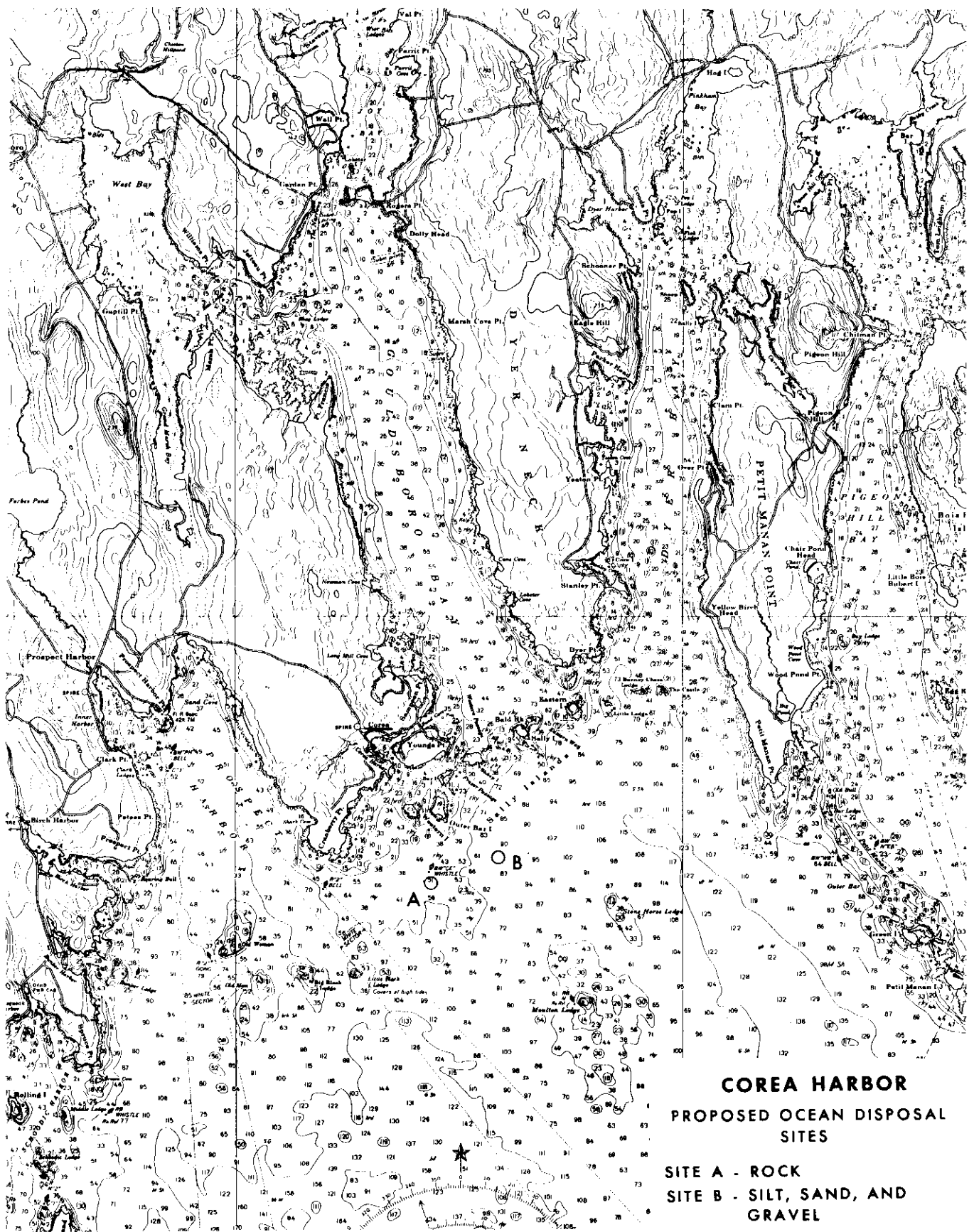
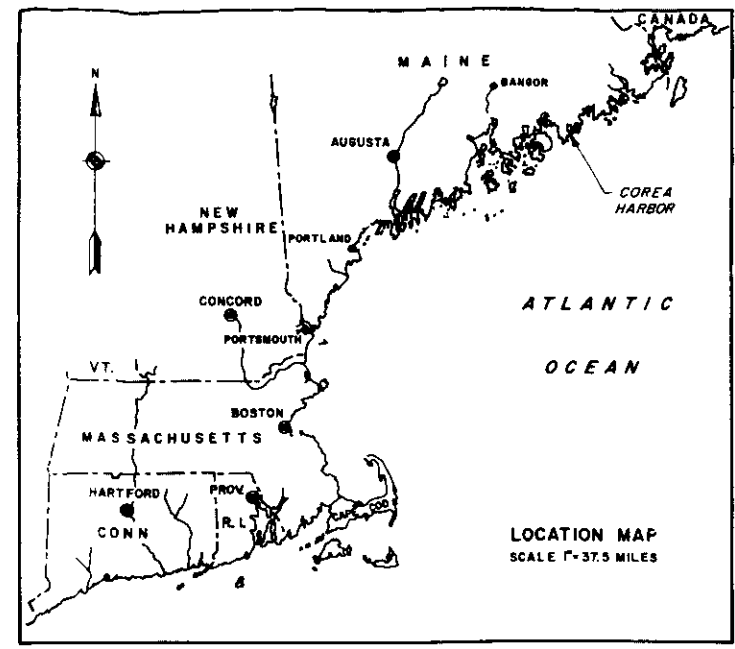
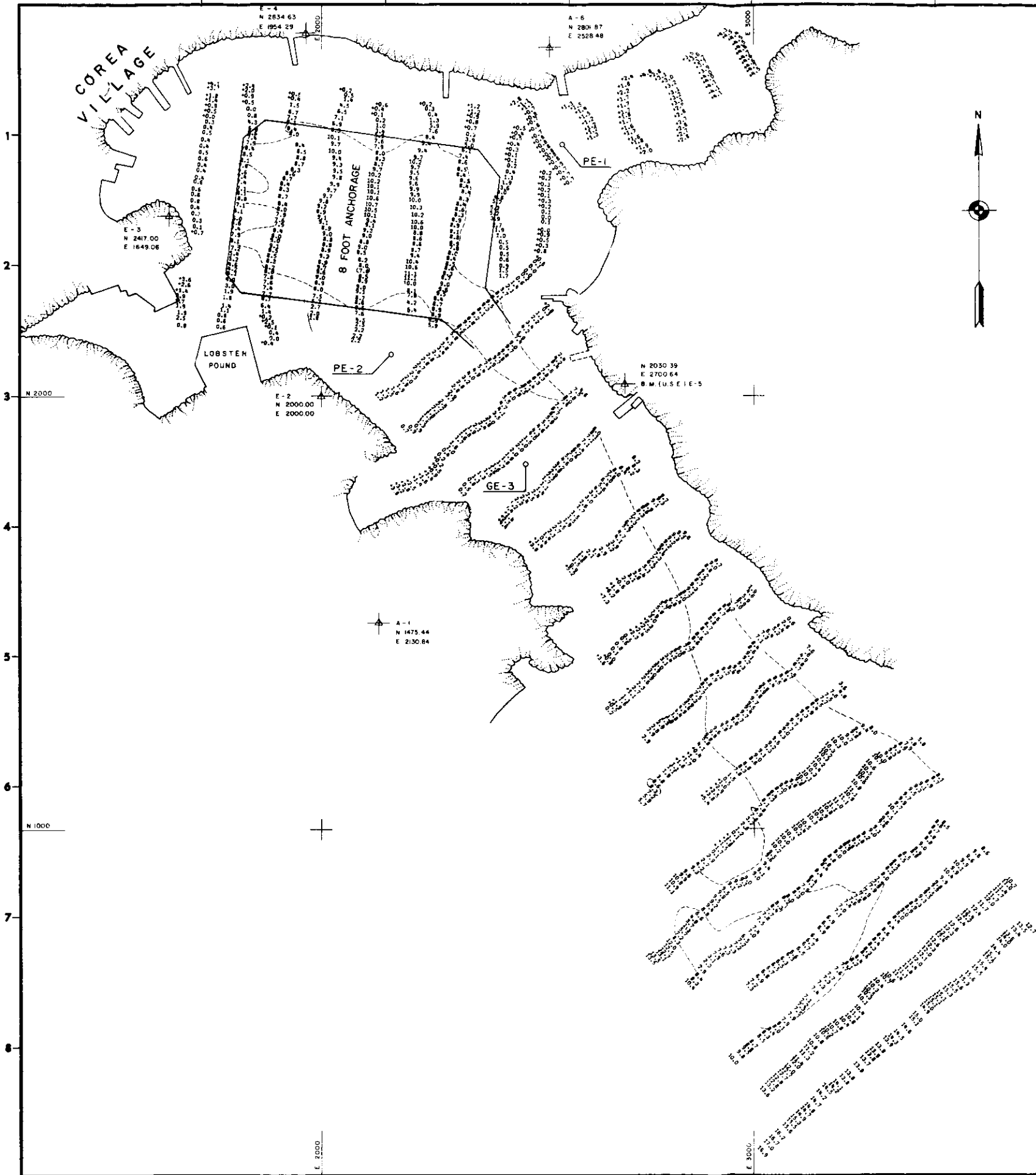
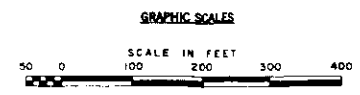


FIGURE 8



NOTES
 Soundings are in feet and tenths and are referred to the plane of Mean Low Water.
 Hydrography from surveys of May 17 & 19, 1977 by Aquatic, Inc.
 Topography from previous surveys.
 B.M.(U.S.E.)E-5. The top of a bronze ball which secures a brass disc to ledge on the easterly side of the harbor entrance Elevation 19.98 feet above Mean Low Water.
 Coordinates are based on a local system using Δ E-2 N 2000, E 2000.
 8-foot contour shown thus: ---
 The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at that time.



REVISOR		DATE	DESCRIPTION	BY
DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS WALTHAM, MASS.				
DR. BY H.C.J. SUBMITTER	TR. BY BCM PROJECT ENGINEER	OL. BY WCR REVIEWER	WATER RESOURCES IMPROVEMENT STUDY COREA HARBOR GOULDSBORO, MAINE ENVIRONMENTAL SAMPLING LOCATIONS	
CHIEF, NEW ENGLAND DIVISION APPROVAL RECOMMENDATION CHIEF, THE BOARD			SCALE 1"=100' SPEC. NO. DACW 33 DRAWING NUMBER 2070 D-5-2	

FIGURE 9

TABLE 2

Bulk Chemical Test Results
Marine Sediments
Corea Harbor, Maine - 1978

<u>PARAMETER*</u>	<u>STATION NUMBER</u>		
	<u>PE-1</u>	<u>PE-2</u>	<u>PE-3</u>
Visual Classification	Dk. Gray Gravelly Sandy Organic Silt	Gray Silty Sand With Organic Plant Debris and Seaweed	Dk. Gray Sand With Organics and Shell Fragments
Grain Size-Med	.019	.270	.395
% Fine	68.6	29.10	3.50
Percent Solids	51.18	61.96	79.04
% Vol. Solids - EPA	8.61	3.82	0.95
- NED	5.58	3.32	2.88
C.O.D.	109,000	58,900	15,900
Tot. KjDL NIT	3,400	1,590	130
Oil and Grease	340	290	510
Mercury	<0.05	<0.05	0.07
Lead	31.3	<10	10.1
Zinc	73.5	40.7	18.2
Arsenic	10.2	3.7	2.3
Cadmium	2.3	0.6	<0.5
Chromium	31.3	12.9	5.1
Copper	23.4	6.4	<5.0
Nickel	31.3	25.8	<10
Vanadium	39.1	32.3	<10
% Tot. Carbon	.33	.24	-
% Hydrogen	3.23	2.8	-
% Nitrogen	.59	.38	-

*All values are expressed as ppm unless otherwise noted.

TABLE 3

Bulk Chemical Test Results
Marine Sediments
Coastal Area Off Corea, Maine

<u>PARAMETER*</u>	<u>STATION NUMBER</u>			
	<u>STA-2</u>	<u>STA-4</u>	<u>STA-5</u>	<u>STA-4</u>
Visual Classification	Brown Silty Gravelly M-F Sand w/Shell Fragments	Brown Sand w/Shell Fragments	Grayish Brown Silty Gravelly Sand w/Shell Fragments	Brown Grayish Gravelly Sand w/Shell Fragments
Grain Size-Med.	.530	.400	.200	1.10
% Fine	9.0	3.8	9.9	1.8
Percent Solids	76.76	74.06	74.14	81.32
% Vol. Solids - EPA	1.76	1.54	1.78	1.36
- NED	0.83	0.80	0.74	0.44
C.O.D.			10,300	5,200
TOT. KJDL NIT			660	310
Oil & Grease			310	30
Mercury	<0.05	<0.05	<0.05	<0.05
Lead			10.8	16.8
Zinc			24.8	18.4
Arsenic	2.9	1.1	2.8	7.5
Cadmium			1.1	1.2
Chromium			7.4	8.0
Copper			<5.0	<5.0
Nickel			13.5	14.4
Vanadium			17.5	22.1

*All values are expressed as ppm unless otherwise noted.

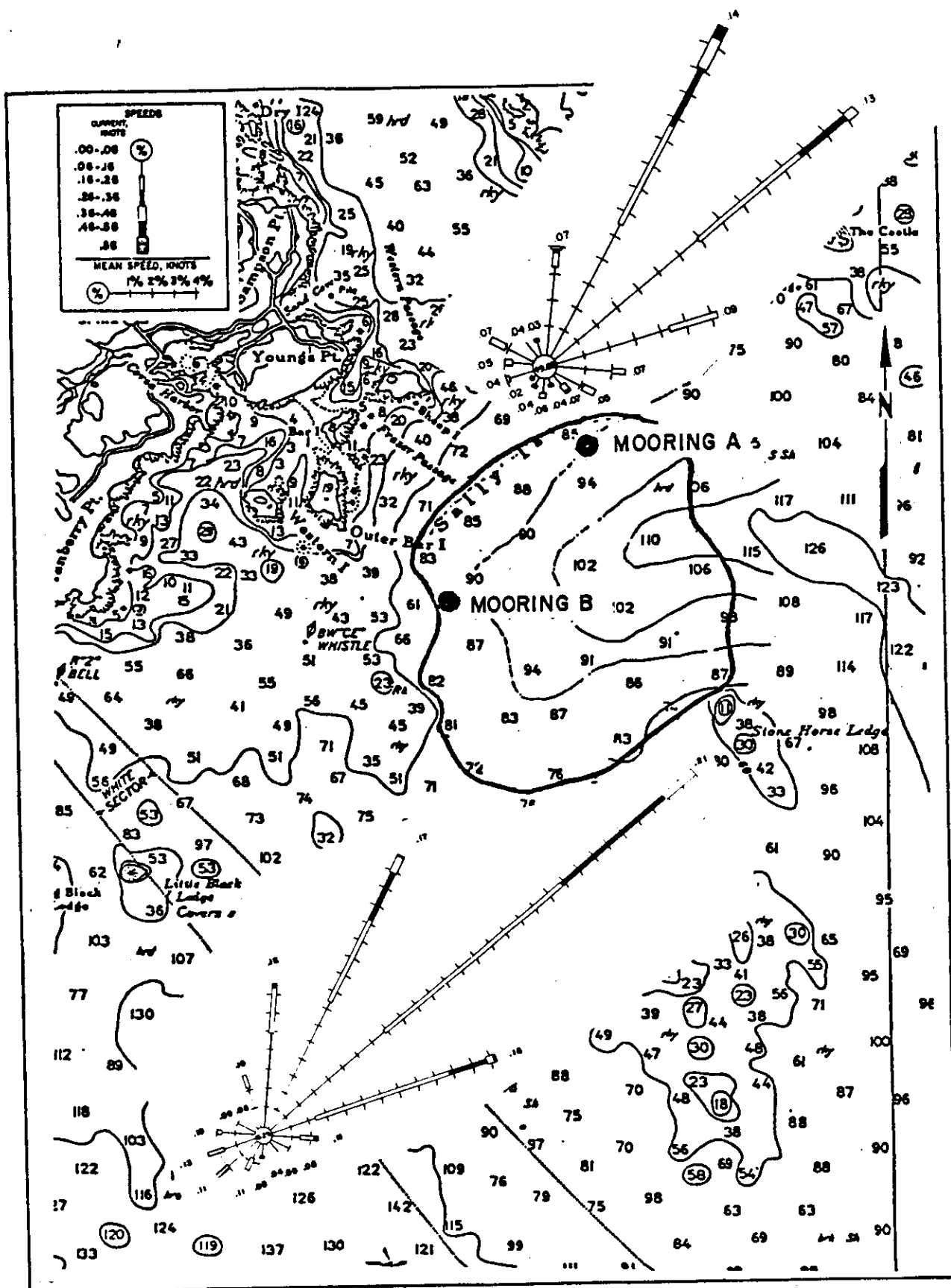


FIGURE 11
 COREA HARBOR
 ROSE DIAGRAMS
 CURRENT SPEED AND DIRECTION
 FOR OFFSHORE CURRENT METER STATIONS
 MOORINGS "A" AND "B"

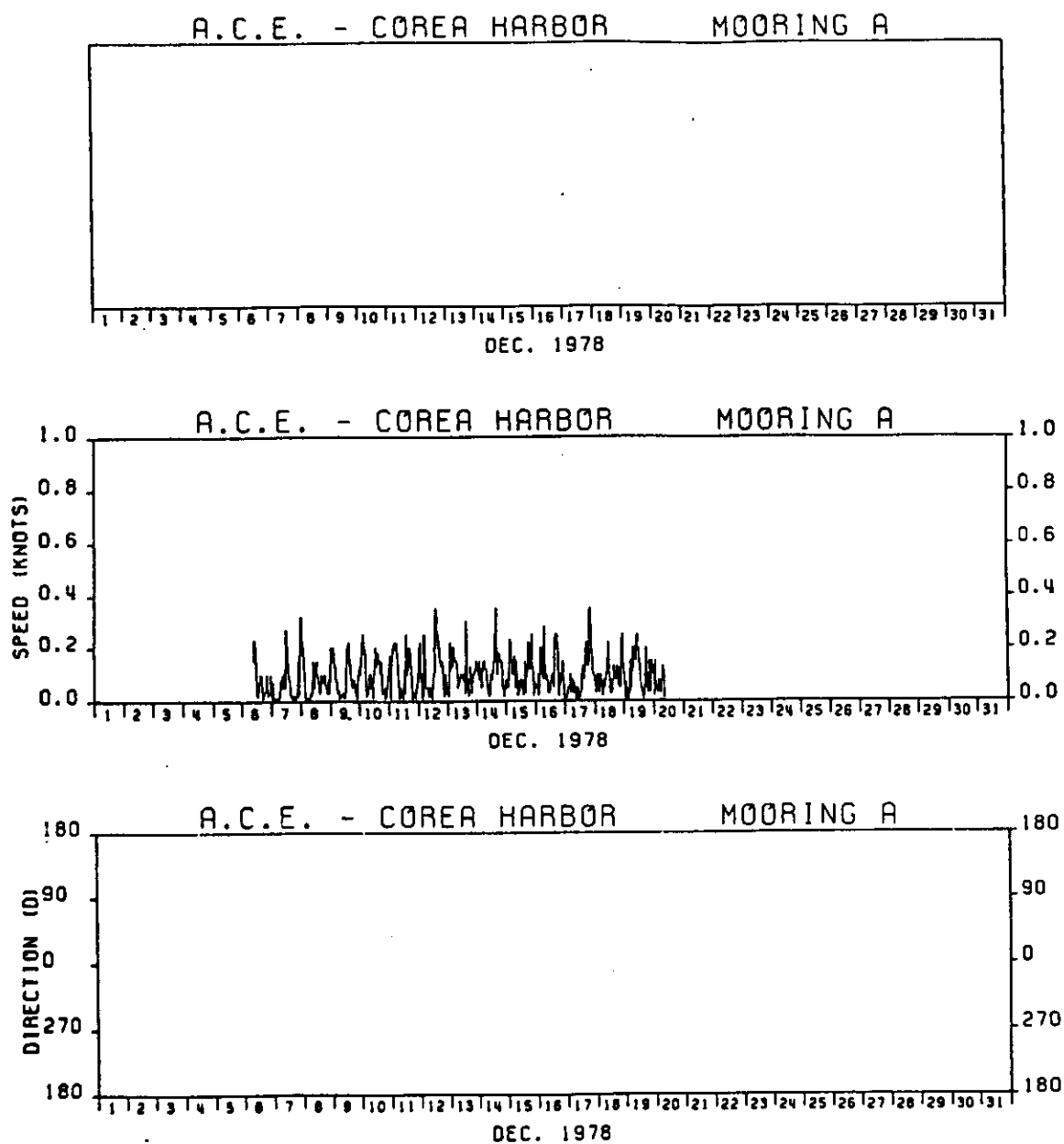


FIGURE 12

COREA HARBOR
CURRENT SPEED AND DIRECTION PLOTS
MOORING "A"
DECEMBER 1978

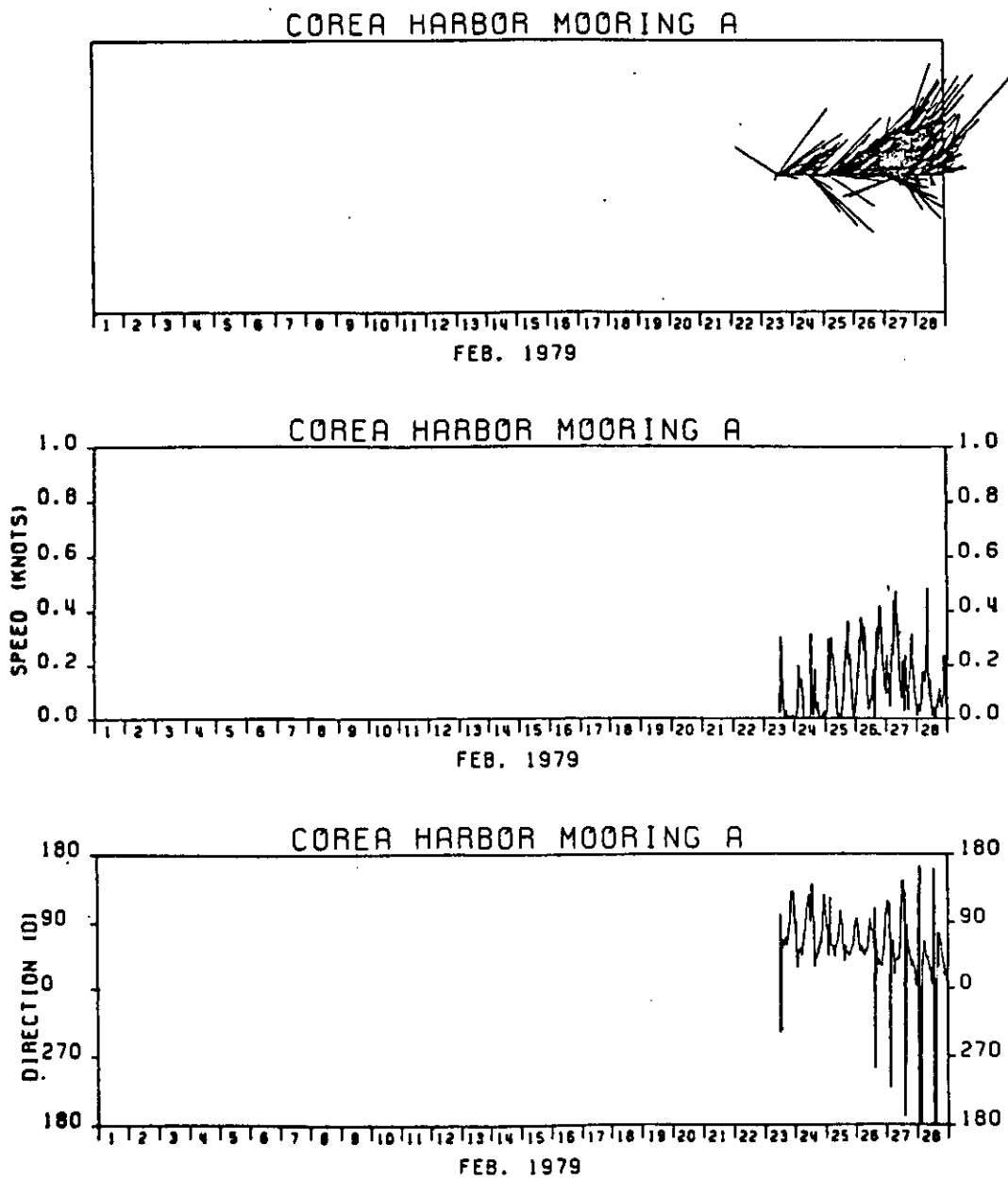


FIGURE 12
CONTINUED

CURRENT SPEED AND DIRECTION PLOTS
COREA HARBOR
MOORING "A"
FEBRUARY 1979

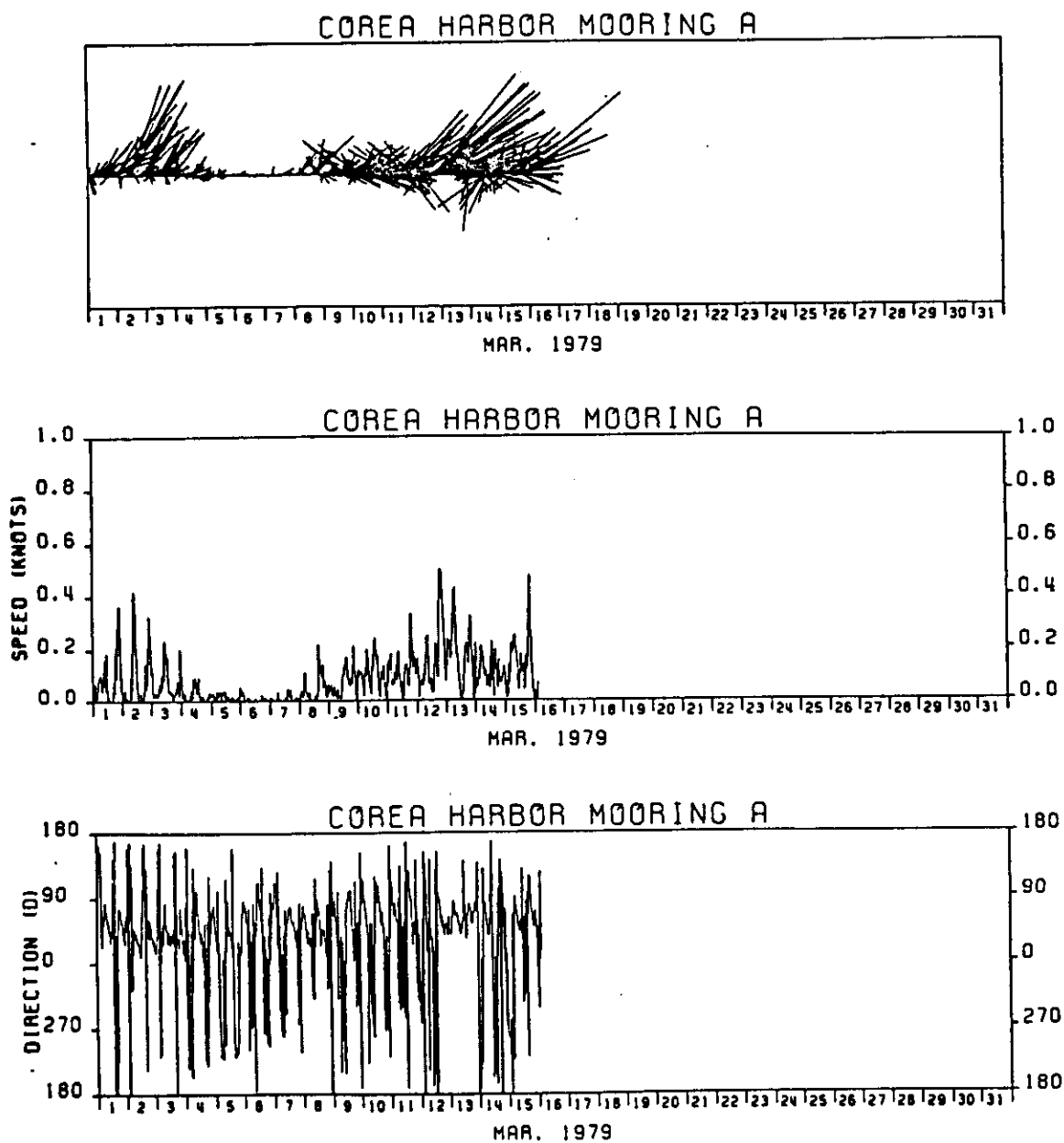


FIGURE 12
CONTINUED

COREA HARBOR
CURRENT SPEED AND DIRECTION PLOTS
MOORING "A"
MARCH 1979

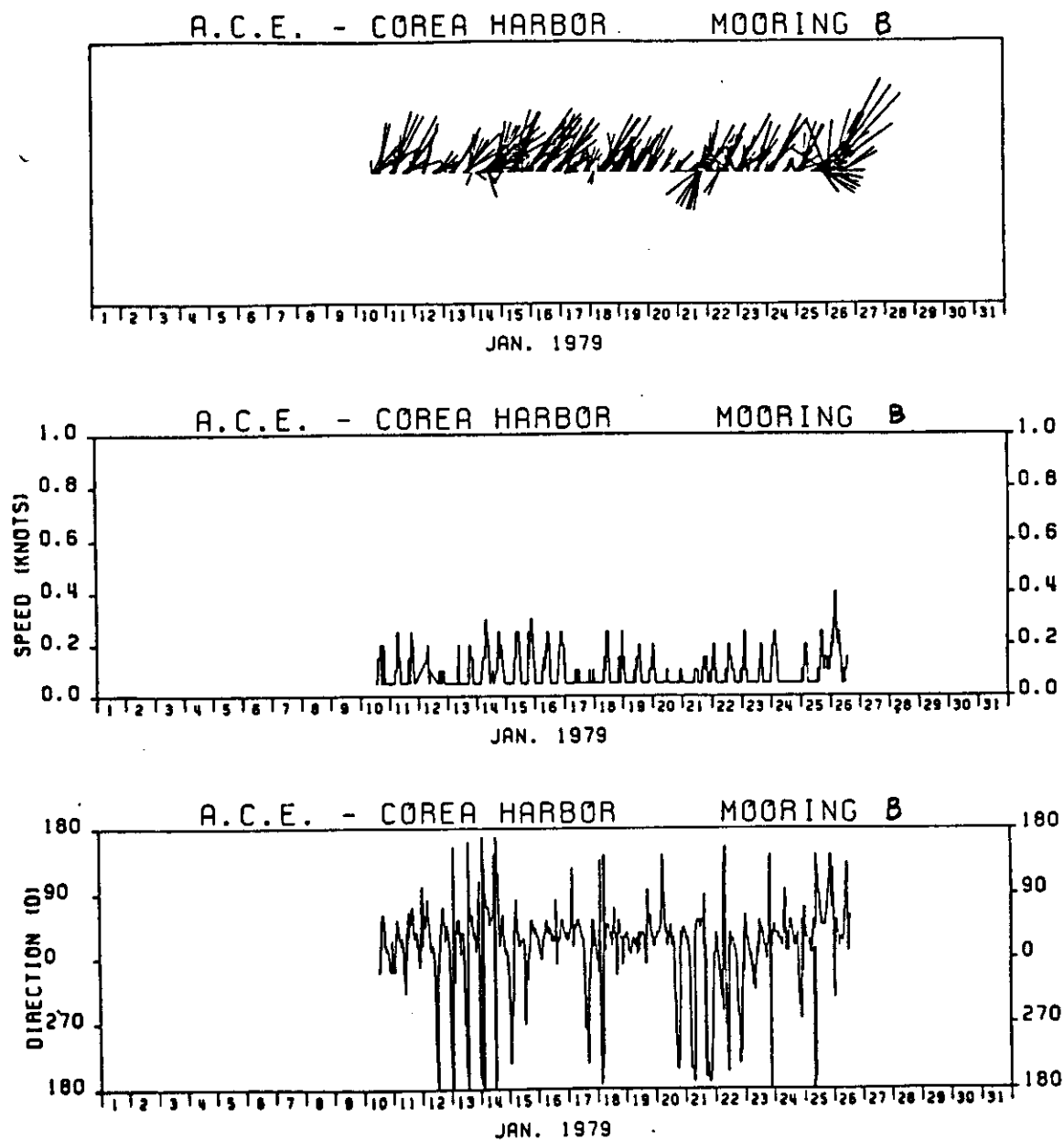


FIGURE 13

COREA HARBOR

CURRENT SPEED AND DIRECTION PLOTS

MOORING "B"

JANUARY 1979

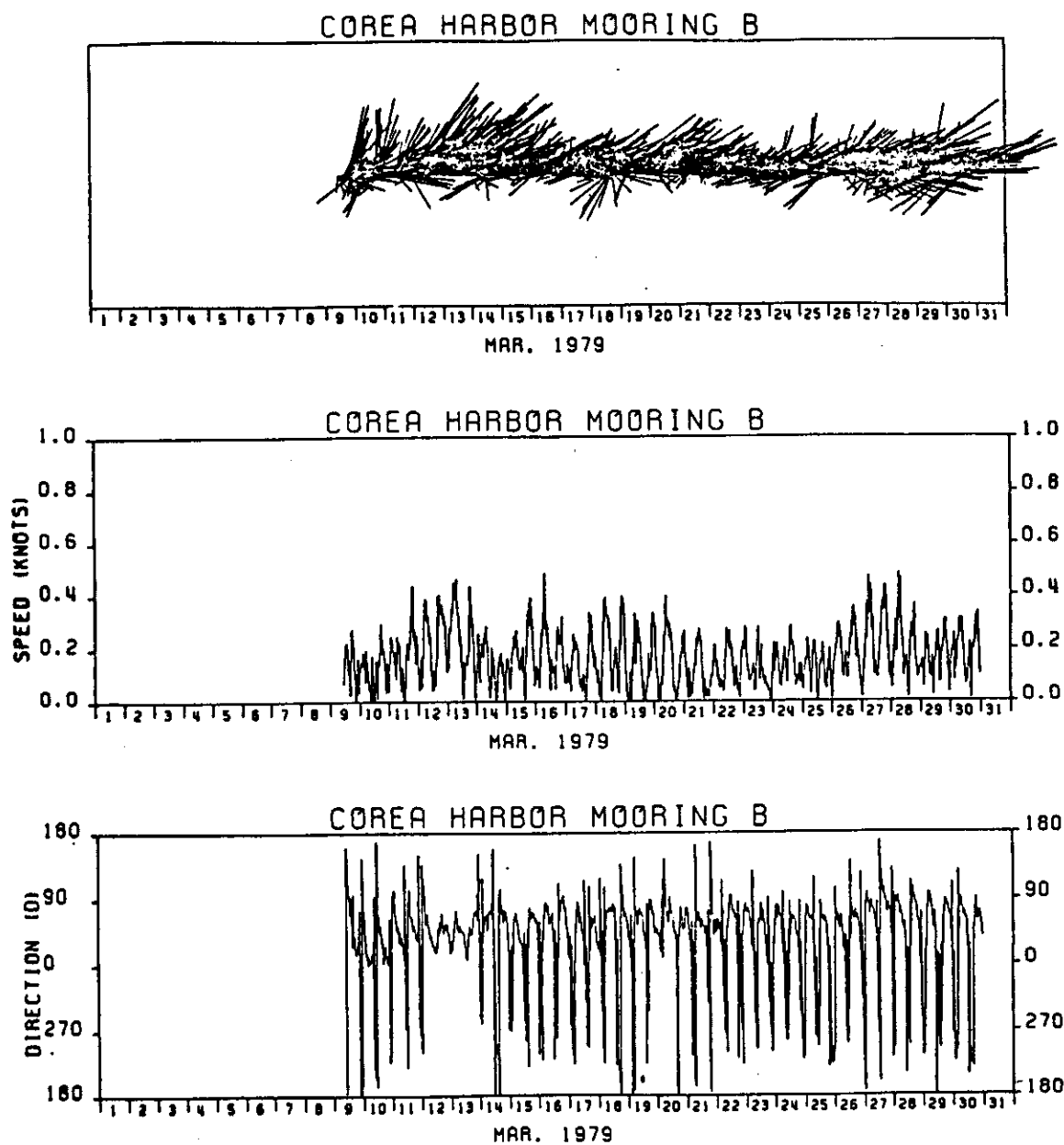


FIGURE 13
CONTINUED

COREA HARBOR
CURRENT SPEED AND DIRECTION PLOTS
MOORING "B"
MARCH 1979

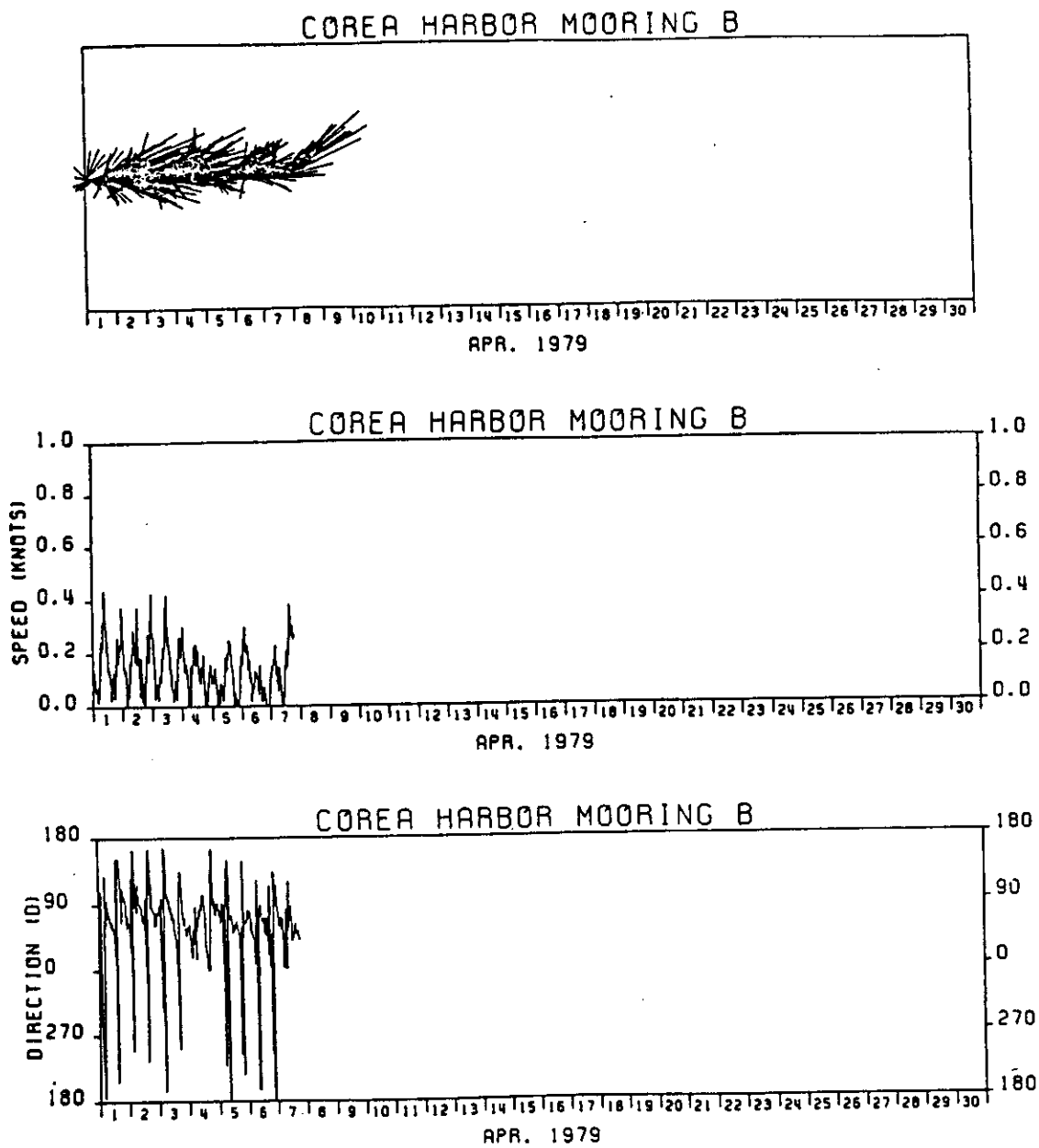


FIGURE 13
CONTINUED

COREA HARBOR
CURRENT SPEED AND DIRECTION PLOTS
MOORING "B"
APRIL 1979

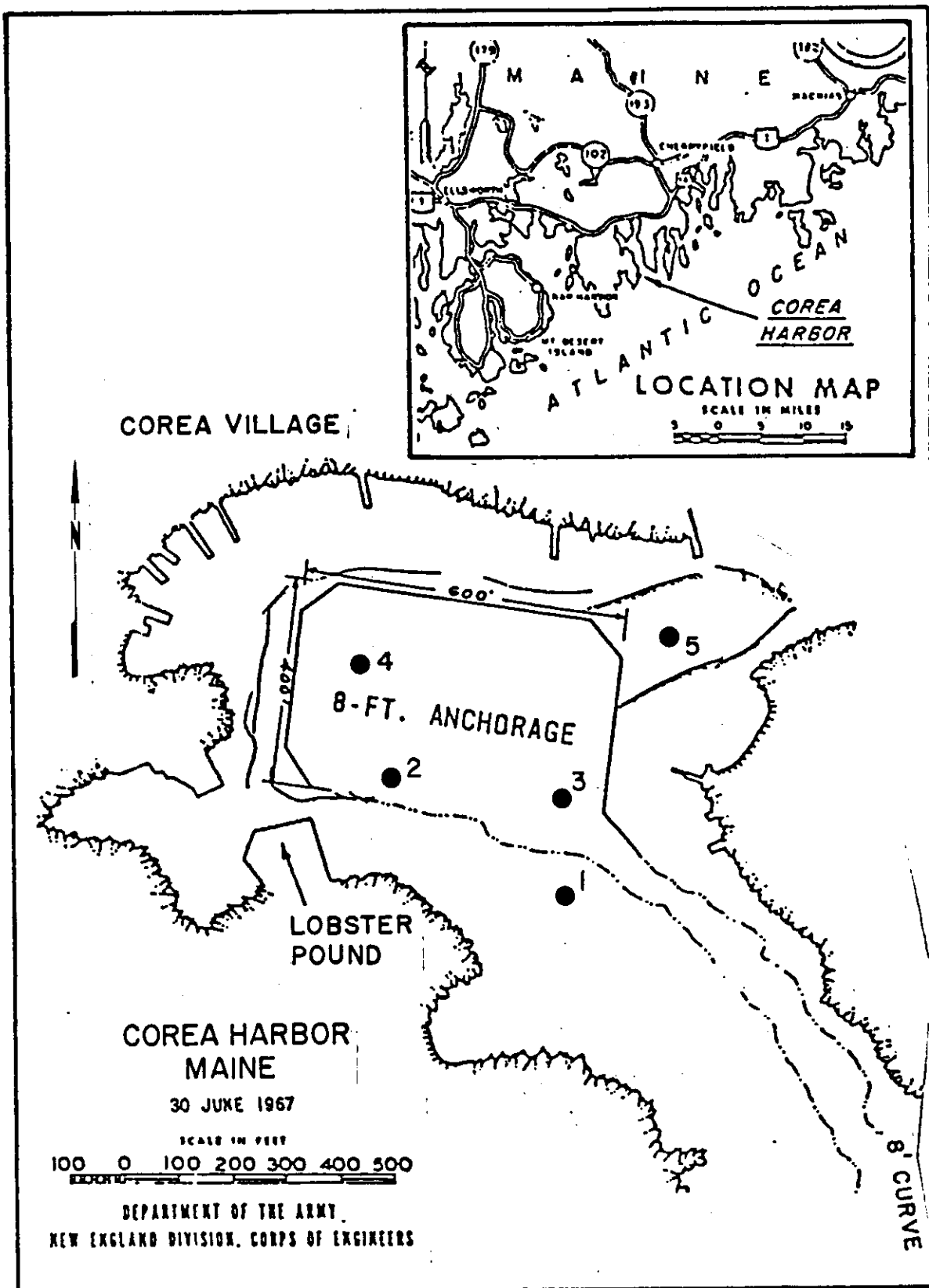


FIGURE 14

COREA HARBOR

SUBTIDAL BENTHIC SAMPLING STATIONS

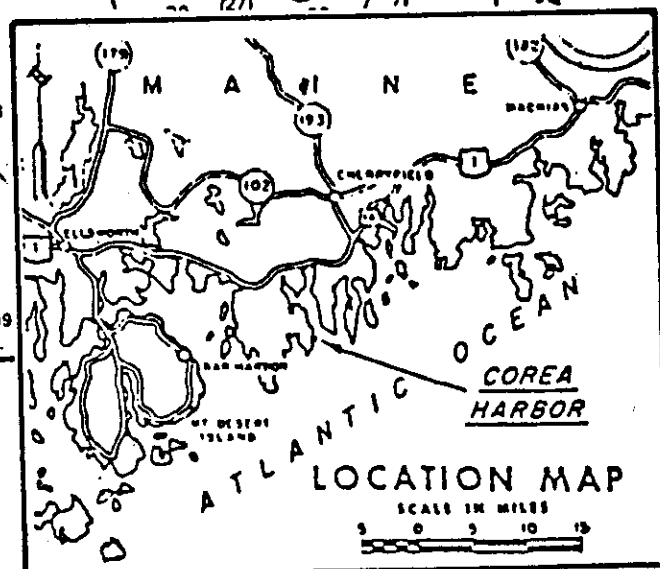
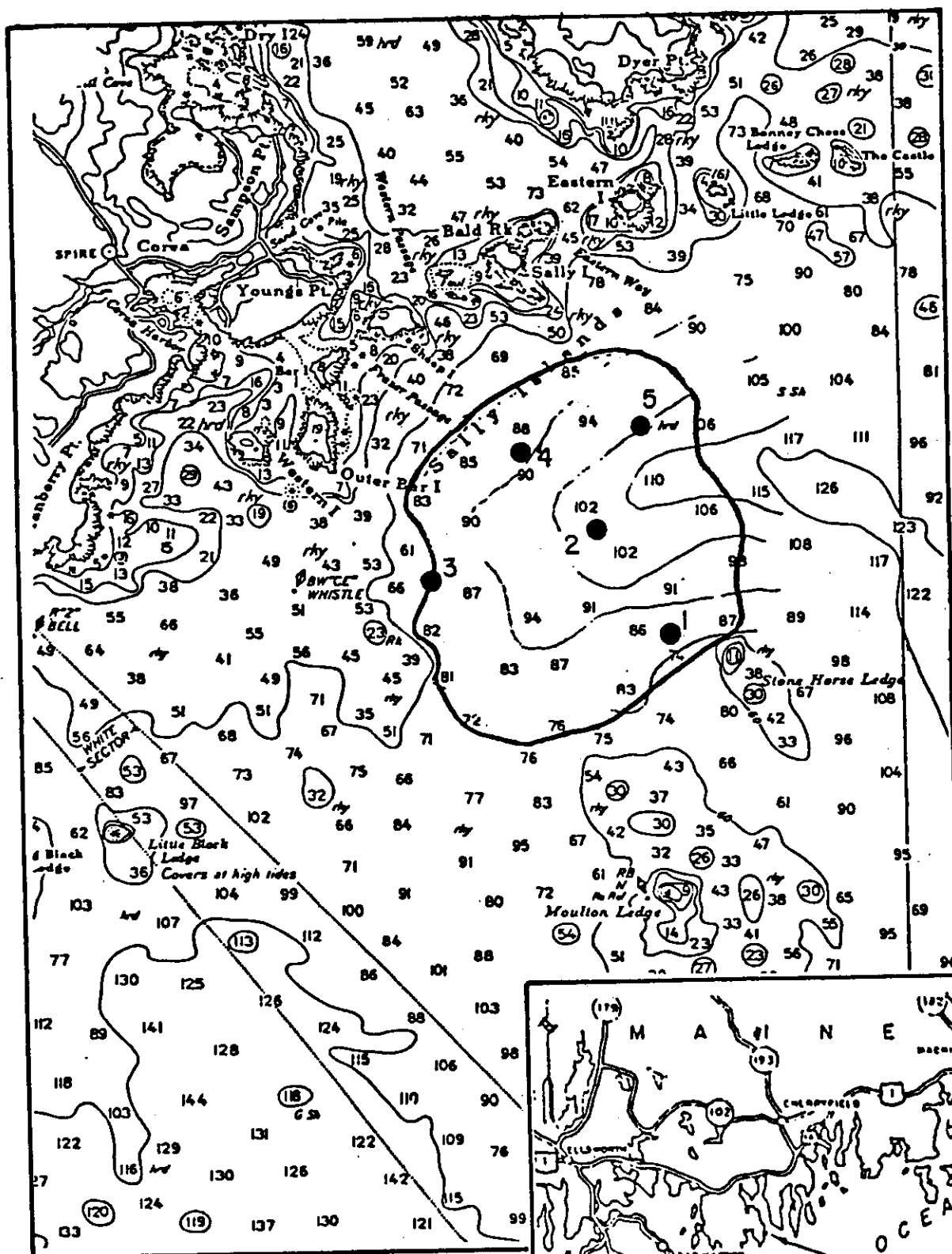


FIGURE 15
OFFSHORE BENTHIC
DREDGE HAUL SITES
IN VICINITY OF COREA HARBOR
OCEAN DISPOSAL SITES

TABLE 4

BENTHIC GRAB SAMPLES
SPECIES LIST - 1978
Corea Harbor, Maine

<u>Species Name</u>	<u>STATION 1</u>				<u>Total Count</u>
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	
<u>Mollusca</u>					
Acmaea testudinalis	-	-	1	-	1
Hiatella sp	-	1	-	-	1
Gastropoda	2	2	-	-	4
Littorina littorea	10	10	5	5	30
Mya arenaria	3	-	-	-	3
Mytilidae spat	4	5	7	-	16
	19	18	13	5	55
<u>Decapoda</u>					
Amphipod sp. (immature)	1	-	-	-	1
Corophium acherusicum	6	-	-	-	6
Corophium bonelli	10	1	-	-	11
Corophium insidiosum	1	-	-	-	1
Crangon septemspinosa	1	-	-	-	1
Dexamine thea	1	-	-	-	1
Eualus pusiolus	-	1	-	-	1
Gammarus oceanicus	-	1	-	1	2
Jassa oceanicus	-	1	-	1	2
Jassa falcata	-	1	-	-	1
Pagurus arcuatus	1	1	4	-	6
Pontogeneia inermis	1	18	1	-	20
	22	24	5	2	53
<u>Oligochaeta</u>	410	916	1026	168	2520
<u>Polychaetes</u>					
Aricidea catherinae	4	2	4	-	10
Capitella capitata	16	98	53	17	
Circeis spirillum	-	1	-	-	1
Eteone sp.	-	1	1	-	2
Euclymene collaris	1	-	-	-	1
Eumida sanguinea	-	1	-	-	1
Eupolymnia nebulosa	1	-	-	-	1
Fabricia sabella	1	-	-	-	1
Harmothoe imbricata	1	4	3	1	9
Microphthalmus aberrans	-	2	-	-	2
Microphthalmus sp.	-	-	-	1	1
Nephtys diacora	3	-	1	-	4
Nephtys sp.	-	2	1	1	4
Nephtyidae juvenile	7	-	-	-	7

TABLE 4 (Continued)

<u>STATION 2</u>					
<u>Species Name</u>	<u>TOTAL COUNT</u>				<u>Total Count</u>
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	
<u>Mollusca</u>					
Mytilidae spat	2	2	3	-	7
Gastropoda	1	-	-	-	1
Lacuna vineta	-	-	-	1	1
	3	2	3	1	9
<u>Deapoda</u>					
Myxidacea	2	-	-	-	2
Diastylis sculpta	1	-	-	-	1
Jassa falcata	-	-	-	3	3
Crangon septemspinosa	-	-	-	1	1
Stenothoidae	1	-	-	-	1
	4	-	-	4	8
<u>Oligochaeta</u>	783	53	28	23	887
<u>Polychaetes</u>					
Capitella capitata	11	37	3	3	54
Chaetozone sp.	5	-	-	-	5
Cirratulidae	3	-	-	-	3
Eteone sp.	1	2	-	-	3
Exogone hebes	-	1	-	-	1
Harmothoe imbricata	1	-	-	-	1
Nereis virens	2	6	1	1	10
Nereis juvenile	6	-	-	-	6
Nephtyidae juvenile	10	4	-	-	14
Microphthalmus aberrans	-	6	-	-	6
Microphthalmus sp.	-	30	-	-	30
Pholoe minuta	1	-	-	-	1
Phyllodoce mucosa	1	-	-	-	1
Phyllodoce maculata	3	-	-	-	3
Polydora ligni	2	-	-	-	2
Prionospio sp.	1	-	-	1	2
Streblospio benedicti	3	4	-	2	9
Schistomeringos caeca	-	1	-	-	1
	50	91	4	7	152

TABLE 4 (Continued)

<u>STATION 3</u>					
	<u>TOTAL COUNT</u>				
<u>Species Name</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>Total Count</u>
<u>Mollusca</u>					
Turtonia minuta	1	-	-	-	1
Mytilidae spat	4	1	1	38	44
Mya arenaria	-	2	-	-	2
Hiatella sp.	1	-	-	-	1
Mytilus edulis	-	-	-	4	4
Acmaea testudinalis	-	-	-	1	1
Littorina littorea	-	2	-	6	8
	6	5	1	49	61
<u>Decapoda</u>					
Gammarus sp.	-	-	-	2	2
Ischyroceridae	-	1	-	-	1
Crangon septemspinosus	-	1	-	-	1
Carcinus meanas	-	-	-	2	2
Caridean udk	-	-	-	1	1
	-	2	-	5	7
<u>Oligochaeta</u>	443	199	136	429	1207
<u>Polychaetes</u>					
Capitella capitata	-	1	4	1	6
Chaetozone sp.	8	-	-	1	9
Chaetozone sp. A	1	-	-	-	1
Cirratulidae	-	-	-	1	1
Eteone longa	1	-	-	2	3
Harmothoe imbricata	-	-	-	3	3
Mediomastus ambiseta	-	-	-	1	1
Nereis sp.	-	2	-	-	2
Nereis virens	5	1	2	2	10
Nereis juvenile	1	-	-	-	1
Nephtys sp.	1	6	6	-	13
Nephtys discors	-	1	3	-	4
Nephtyidae juvenile	21	47	34	2	104
Phyllodoce maculata	1	-	-	-	1
Polydora ligni	-	5	-	5	10
Prionospio sp.	2	-	3	1	6
Prionospio steenstrupi	1	1	1	-	3
Pygospio elegans	2	-	-	1	3
Spio filicornis	-	-	-	2	2
Streblospio benedicti	2	18	10	3	33
	46	82	63	25	216
<u>Platyhelminthes</u> Turbellaria	-	3	-	-	3

TABLE 4 (Continued)

<u>STATION 4</u>					
<u>Species Name</u>	<u>TOTAL COUNT</u>				<u>Total Count</u>
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	
<u>Mollusca</u>					
Mytilidae spat	1	-	1	-	2
Mya arenaria	-	3	-	4	7
Histella sp.	2	-	-	-	2
Gastropoda	-	-	-	1	1
Littorina littorea	1	1	2	1	5
	4	4	3	6	17
<u>Amphipoda</u>					
Corophium insidiosum	-	-	1	-	1
<u>Oligochaeta</u>	169	315	92	391	967
<u>Polychaetes</u>					
Capitella capitata	34	-	3	12	49
Chaetozone sp.	-	1	12	1	14
Chaetozone sp. A	-	-	-	4	4
Cirratulidae	-	2	7	5	14
Nereis sp.	1	-	-	1	2
Nereis virens	2	1	-	1	4
Nephtys sp.	-	4	4	1	9
Nephtys discors	-	3	-	4	7
Nephtyidae juvenile	39	163	176	217	595
Phyllodoce mucosa	-	1	-	-	1
Polydora ligni	-	-	1	3	4
Prionospic sp.	-	-	1	2	3
Pygospio elegans	1	2	2	2	7
Spionidae	-	-	1	-	1
Streblospio benedicti	13	95	240	208	556
	89	272	437	461	1259

TABLE 4 (Continued)

<u>STATION 5</u>					
<u>Species Name</u>	<u>TOTAL COUNT</u>				<u>Total Count</u>
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	
<u>Mollusca</u>					
Mytilidae	8	7	2	-	17
Macoma balthica	1	1	-	1	3
Mys arenaria	4	3	9	6	21
Hiatella sp.	1	3	-	-	4
Littorina littorea	2	-	4	-	6
Hydrobia totteni	71	38	202	98	409
Lacuna vineta	-	-	1	1	2
Margarites helicina	-	-	-	1	1
	87	52	218	107	464
<u>Decapoda</u>					
Corophium insidiosum	2	-	-	1	3
Corophium sp.	-	-	2	-	2
Photis macrocoxa	1	-	-	-	1
Jassa falcata	5	-	-	1	6
Gammarus lawrencianus	-	-	-	1	1
Crangon septemspinosa	1	-	-	-	1
Jaera marina	-	-	1	-	1
Carcinus maenas	-	-	1	-	1
	9	-	4	3	16
<u>Oligochaeta</u>	655	903	1000	1301	3859
<u>Polychaetes</u>					
Chaetozone sp.	1	-	-	-	1
Cirratulidae	-	2	2	22	26
Chaetozone sp. A	1	2	5	39	47
Capitella capitata	1	-	10	58	69
Fabricia sabella	-	-	2	-	2
Phyllodoce mucosa	1	1	-	2	4
Pygospio elegans	49	48	57	57	211
Polydora ligni	11	3	15	67	96
Streblospio benedicti	673	987	1216	1512	4388
Mediomastus ambiseta	1	-	-	-	1
Nephtys discors	5	3	-	1	9
Nephtyidae juvenile	32	33	18	17	100
Nephtys sp.	2	3	2	2	9
Spiophanes bombyx	-	-	1	-	1
Spionidae	6	-	-	-	6
	753	1082	1328	1777	4940

TABLE 4 (Continued)

BENTHIC STATION SUMMARY
COREA HARBOR, MAINE

<u>Station No.</u>	<u>Species #</u>		<u>Total No. Individuals</u>		
1	50		3076		
2	27		1056		
3	33		1494		
4	22		2244		
5	37		9279		

<u>Station</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Mollusca	6/55	3/9	6/65	5/17	8/464
Decapoda	12/53	5/8	5/7	1/1	8/16
Polychaetes	31/448	18/152	20/216	15/1259	15/4940
Oligochaeta	2520	887	1207	967	3859

TABLE 5

EPIBENTHIC DREDGE HAULS
SPECIES LIST
COREA, MAINE

MolluscaAmphineura (Chitons)*Iscnochiton alba*Pelecypoda (bivalves)*Crennella* sp.*Placopecten magellanicus**Anomia* sp.*Astarte castanea**Cerastodermar pinnulatum**Lyonsia hyalina**Modiolus modiolos**Astrate undata**Cyclocardia borealis**Hiatella* sp.Gastropoda*Gastropoda* sp.*Acmaea testudinalis**Crucibulum striatum**Colus pygmaeus**Neptunea decemostata**Buccinum undatum**Nassarius trivittatus*Polychaetes*Asabellides oculata**Lepidonotus squamatus**Ampharete arctica**Nereis pelagica**Circeis spirillum**Phylodoce maculata**Dodecaceria* sp.*Polydora socialis**Euchone elegans**Polydora websteri**Eluclyemene collaris**Pollodoce* sp.*Eulalia viridis**Potamilla reniformis**Exogone verugera**Spionidae* sp.*Harmothoe extenuata**Spirorbis granulatus**Harmothoe imbricata**Spirorbis spriorbis*CrustaceaCirripedia*Balanus* sp.*Balanus crenatus**Balanus balanus*Isopoda*Cyathura polita*Amphipoda*Jassa falcata**Carprella septentrionalis**Unciola irrorata**Eualus pusiolus**Orchomenella pinguis**Amphipoda* sp.Decapoda*Crangon septemspinosus**Pagurus acadianus**Cancer borealis**Cancer irroratus**Pandulus* sp.*Crangonidae*Scaphopoda*Dentalium occidentale*Nudibranchia*Dendrodoa* spp.

TABLE 5 (Continued)

EPIBENTHIC DREDGE HAULS
SPECIES LIST (CONTINUED)
COREA, MAINE

Rhynchocoela sp.

Echinodermata

Solaster paposus
Henricia sanguinolenta
Asterias sp.
Strongylocentrotus droebachiensis
Echinarachnius parma

Porifera

Polymastia robusta
Isodictya palmata

Ectoproct

Bugula harmsworthi
Caberea ellisi
Callopora aurita
Campanularidae
Cribrilina annulata
Cribrilina punctata
Crisia denticulata
Crisia eburnea
Dendrobeanina murrayana
Disporella (now Lichenopora) hispida
Electra monostachys
Electra pilosa
Eucratea loricata
Schizoporella sp.
Scruparia clavata
Sertularia cupressian
Smittinidae
Stomachetosella sinuosa
Tricellaria gracilis
Tubulipora sp.

Echiurida

Goldfingia sp.
Phascolion strombi

Ascidacea

Molgula sp.
Amaroucium sp.
Didemnum albidum
Boltenia ovifera
Halocynthia pyriformis
Boltenia echinata

Cnidaria (see anemones)

Actinostola callosa

Hydroids

Eudendrium dispar
Eudendrium ramosum
Hydrallmania falcata
Tubularia sp.

TABLE 5 (Continued)

Epibenthic Dredge Summary
Corea Harbor
Proposed Disposal Area

<u>Station No.</u>	<u>Species #</u>	No. of <u>Individuals</u> (Based on Subsample, Counts not absolute)
1	27	22
2	34	43
3	33	6
4	41	93
5	45	54

A total of 97 different species were identified. The most commonly occurring animals observed were Boltenia echinata (stalked ascidian), Asterias vulgaris (sea star), Cancer borealis and Cancer irroratus (rock crabs), Crangon septemspinosus (sand shrimp), Molgula sp. (sea grapes), Dendroda sp. (nudibranch), and Astarte undata (bivalve). The sea scallop Placopecten was taken in low numbers at all stations.

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- Chase, G. 1978. Scuba Survey, Corea Harbor, Maine. Interoffice memorandum 30 October 1978. 3 pages
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- Naval Facilities Engineering Command. 1975.

SECTION 404 EVALUATION

References

- a. Section 404(b) of Public Law 92-500, Federal Water Pollution Control Act.
- b. 40 CFR 230.4 - 230.5 dated 5 September 1974.
- c. EC 1105-2-90, Appendix C, dated 10 October 1978.

The Proposed Plan

The proposed plan calls for enlargement of the existing 5.5 acre anchorage to 8.5 acres. One and one-half acres will be dredged in the northeast corner of the harbor. Another one and one-half acres will be added to the southern side of the anchorage. Both of these areas will be dredged to 6 feet mean low water (MLW).

In addition, the access channel to the harbor will be dredged to its authorized dimensions of 100 feet wide, approximately 2,000 feet in length and 8 feet deep MLW. An outcropping of rock is located in the access channel. Approximately 3,000 cubic yards (c.y.) will be removed by blasting.

A total of 31,000 c.y. of dredged material, from both the anchorage and access channel, will be disposed of at an open water site approximately one nautical mile south of Outer Bar Island, (Loran A coordinates 1H3-1944 and 1H7-1114). Rock will be disposed of near the Whistle Buoy, southwest of Western Island, in an effort to create additional lobster habitat and mitigate impacts to commercial trawling.

Project Authorization and Status

Authorization for this project comes under the provisions of Section 107 of the 1960 River and Harbor Act, Public Law No. 86-645. This Detailed Project Report and Environmental Assessment will be publicly reviewed and upon satisfactory resolution of concerns that surface from the review, these reports plus the Section 404(b) Evaluation will be sent to the Office of the Chief of Engineers (OCE) for approval.

Environmental Concerns

Impacts to the marine environment associated with this improvement project have been evaluated. The discharge of approximately 31,000 c.y. of dredged material is likely to cause an increase in turbidity and a subsequent minor decrease, if any, in the dissolved oxygen levels in the disposal area. Both the turbidity and dissolved oxygen levels will return to normal within minutes once the individual barge dump has been completed. The disposition of blasted rock should have no effect on the water column. Some destruction of benthic fauna is likely to occur to

organisms unable to leave the disposal area. However, benthic recolonization of the disposal area will begin soon after the project has been completed.

Technical Evaluation

A technical evaluation of the project with regard to ecological impacts has been made. The technical evaluation describes the types of ecological effects that may result from the proposed action. Ecological impacts due to project implementation can be divided into two main categories:

- (1) Physical effects, and
- (2) Chemical-biological interactive effects.

Conclusions

An ecological evaluation has been made following the evaluation guidance in 40 CFR 230.4, in conjunction with the evaluation considerations in 40 CFR 230.5.

Appropriate measures have been identified and incorporated in the proposed plan to minimize adverse effects on the aquatic environment as a result of the discharge.

Consideration has been given to the need for the proposed project alternative methods of disposal that are less damaging to the environment and such water quality standards as are applicable by law.

Use of the selected disposal area is considered to be environmentally acceptable. All other alternatives are presently considered impracticable or less environmentally acceptable.

Findings

The discharge area for the proposed improvement dredging project at Corea Harbor has been specified through the application of the Section 404(b)(1) Guidelines.

The project files and Federal regulations were reviewed to properly evaluate the objective of Section 404 of Public Law 92-500. Based on this review, a public notice is necessary. The notice will focus on the element of the project which involves the discharge of dredged material into navigable waters of the United States. Public views will be solicited and incorporated where applicable.

Analysis of the following tables can be interpreted best by concurrent examination of or an adequate familiarity with the EPA Guidelines (40 CFR, Section 230.4 and 230.5), as the remarks herein are intended to answer questions specified in these sections.

Physical and Chemical - Biological Interactive Effects

Section 230.4(a)

(a) Physical Effects (1 through 3)

(1) Effects on Wetlands. There will be no degradation or destruction of wetlands associated with the project.

(2) Effects on the Water Column. There will be an increase in turbidity associated with disposal. During actual disposal operations, it has been calculated that 96-98 percent of the spoil is rapidly carried gravitationally to the bottom, with only 2-4 percent of the material lost to suspension.

(3) Effects on Benthos. Spoil disposal would destroy (smother) any benthic populations inhabiting the disposal site.

(b) Chemical-Biological Interactive Effects (1 through 3)

(1) (i) Dredged Material from Corea Harbor is composed predominantly of sand, gravel, and other naturally occurring sedimentary materials with particle sizes primarily larger than silt.

(ii) Dredged material would not be used for beach nourishment or restoration.

(iii) (a) The material proposed for discharge is substantially the same as the substrate at the proposed disposal site.

(b) The site from which the material proposed for discharge is to be taken is sufficiently removed from sources of pollution.

(c) Adequate terms and conditions have been imposed in order to provide reasonable assurance that the bulk of the material proposed for discharge will not be moved by currents.

Sections 230.4(b)(2) and (3) have been excluded from the evaluation as conditions specified in paragraphs (b)(1)(i) and (b)(1)(iii) were determined to exist.

(c) Procedure for Comparison of Sites (1 and 2)

(1) Sediment analysis has been done by the Army Corps of Engineers, NED, for Corea Harbor, as well as for the offshore disposal area.

(2) An analysis of the biological community at the proposed disposal area has been done.

Water Quality Considerations

Section 230.4-2

If during the course of disposal operations stated EPA water quality violations are identified, consideration would be given to termination of the project.

Selection of Disposal Sites and Condition of Discharges of Dredged or Fill Material

Section 230.5

General Considerations and Objectives (1 through 8)

(a) In evaluating whether or not to permit the proposed discharge, consideration has been given to the need for the proposed activity, the availability of alternative sites and methods of disposal that are less damaging to the environment. The following objectives have been considered in making a determination on the proposed discharge:

(1) Discharge activities will not significantly disrupt the chemical, physical or biological integrity of the aquatic ecosystem.

(2) Discharge activities would temporarily disrupt the food chain as increased turbidity during disposal operations would adversely affect planktonic populations which serve as a food source for high trophic organisms. This would be an extremely localized effect. Resident dump site organisms that are a food source for other species would be buried. Repopulation by a similar community should commence shortly after disposal activities cease. Abundant neighboring species populations will release larva initiating recruitment recolonization.

(3) Discharge activities will temporarily inhibit faunal movement at the disposal site. This would last for a relatively short period of time ending once disposal operations are completed.

(4) Not applicable. There are no wetlands in or near the proposed disposal area.

(5) Not applicable. Areas which serve the function of retaining natural high waters or floodwaters are not found in the disposal area.

(6) Application of sound dredging and disposal techniques should help minimize adverse turbidity levels resulting from the discharge of sediments.

(7) Discharge activities might temporarily reduce aesthetic values at the disposal site. Recreational and economic values would not be expected to be either enhanced or reduced at the disposal site, although lobster and certain bottom feeding fish species are known to be attracted to newly introduced sediments thus increasing the catch per unit effort at such sites.

(8) Degradation of water quality would be avoided through application of Section 230.4, 230.5(c) and (d).

Considerations Relating to Degradation of

Water Use at Proposed Disposal

Sites (1 through 10)

(b) (1) Municipal Water Supply Intakes. No public water supply intakes are located in or near the disposal area.

(2) Shellfish (i through iv)

(i) The disposal site is not distinguished as an area of high commercial shellfish concentration.

(ii) The disposal site has been located in an area of minimal current velocities and at a distance thought to minimize possible movement of sediments into productive shellfish areas.

(iii) Dredged material would not create any topographical abnormalities that would result in undesirable changes in current patterns, salinity patterns, and flushing rates that would affect shellfish.

(iv) Disposal operations should be scheduled from April through June to avoid interference with reproduction processes and undue stress to juvenile forms of shellfish.

(3) Fisheries (i through iii)

(i) No significant disruption to fish spawning and nursery areas should occur as a result of disposal of dredged material.

(ii) Disposal operations should not interfere with fish spawning cycles or migration patterns and routes.

(iii) There is no significant submerged or emergent vegetation at the disposal site.

(3) The disposal site is not known to be turbulent.

(4) Any stratification that may occur at the disposal site is not expected to significantly affect disposal activities.

(5) No studies on mixing patterns, other than visual observations, have been conducted at the disposal site.

(6) There are no known significant factors (i.e., strong currents, wind driven waves, etc.) that would significantly affect disposal activities.

FINDING OF NO SIGNIFICANT IMPACT

The proposed improvement dredging project at Corea Harbor will entail the removal of approximately 33,570 cubic yards of material from portions of the harbor to increase the existing anchorage area by three acres. The additional anchorage area would be dredged to a depth of 6 feet below mean low water. We have evaluated various alternatives for dredging and disposal and the proposed plan (Plan C) is the most environmentally acceptable option and as Table 6 indicates has met all of the applicable environmental requirements. The environmental impacts associated with this project have been reviewed and presented in the Environmental Assessment.

The determination to prepare an Environmental Assessment, as opposed to an Environmental Impact Statement, was based on the following considerations:

- The fact that the sediments proposed to be dredged are suitable for open water disposal,
- Successful selection of an ocean disposal site, which will minimize impacts to commercial fishery activities as well as natural resources,
- The fact that the proposed plan will not involve wetlands or affect any endangered species, archaeological and/or cultural resources or commercially important shellfish populations, and
- Coordination with appropriate Federal and State agencies to insure that their various concerns and suggestions were made known to the Corps so that their concerns could be addressed during project planning.

10 March 1981
DATE



C. E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

TABLE 6

Environmental Protection StatutesRelationship of Proposed Corea Harbor Project
to Environmental Requirements

<u>Federal Policies</u>	Plan C Dredging Access Channel 8 feet deep & 100 feet wide and 3 acres of mooring
Archaeological and Historical Preservation Act	Full Compliance
CZM Act of 1972	See below
Endangered Species Act of 1973	Full Compliance
Estuary Protection Act	Full Compliance
Clean Water Act	Full Compliance
Fish and Wildlife Coordination Act	Full Compliance
Marine Protection, Research and Sanctuary Act	Full Compliance
NEPA	Full Compliance
River and Harbor Act of 1899	Full Compliance
Protection of Wetlands E.O. 11990	Full Compliance
Land and Water Conservation Fund Act	Not Applicable
Flood Plain Management E.O. 11988	Not Applicable
Wild and Scenic Rivers Act	Not Applicable
Clean Air Act	Full Compliance
Federal Water Project Recreation Act	Not Applicable
Water Resource Planning Act of 1966	Not Applicable
<u>State and Local Policies</u>	
Maine CZM Program	Full Compliance
Maine DEP	Full Compliance
<u>Required Federal Entitlements</u>	
None Required	

CONCLUSIONS

As Division Engineer of the New England Division, Corps of Engineers, I have reviewed and evaluated in the overall public interest all pertinent data concerning the proposed plan of improvement, as well as the stated views of other interested agencies and the concerned public relative to the various practical alternatives in providing navigation improvements in Corea Harbor, Maine.

The possible consequences of alternatives have been studied according to engineering feasibility, environmental impacts, economic factors of regional and national resource development and other considerations of social well-being in the public interest. The ramifications of these issues have been stated in detail in the formulation of this plan of improvement and in other sections of this report.

In summary, there are substantial benefits to be derived by providing the commercial fishing interests of Corea Harbor with sufficient anchorage area to accommodate the existing and planned future fleet, and with an entrance channel to provide for safe access to the harbor at all stages of the tide.

It is noted that the improvement would cause a minor disruption of the environment during dredging and disposal operations. However, as those impacts are not considered significant, an Environmental Assessment has been performed in lieu of an Environmental Impact Statement. Due to the significant benefits attributable to the commercial fishing industry, it is considered that this adverse environmental effect would be more than offset by improvement in the overall economic growth of the region.

I find that the proposed action, as developed in this report, is based on a thorough analysis and evaluation of the various practicable alternative courses of action for achieving the stated objective; and that wherever adverse effects are found to be involved, they cannot be avoided by following reasonable alternatives and still achieve the specified purposes; and that where the proposed action has an adverse effect, this effect is either ameliorated or substantially outweighed by other considerations. The recommended action is consistent with national policy, statutes, and administrative directive, and should best serve the interest of the general public.

RECOMMENDATION

The Division Engineer recommends that modification of the existing Federal navigation project at Corea Harbor, Gouldsboro, Maine be authorized by the Chief of Engineers under the provisions of Section 107 of the River and Harbor Act of 1960, as amended.

The project would provide for an access channel 8 feet deep and 100 feet wide, extending from deep water to the existing anchorage basin, a distance of approximately 2,000 feet. In addition, the existing 5.5 acre anchorage would be expanded 3 acres. The three additional acres of anchorage would be 6 feet deep at mlw. The total construction cost for the project is presently estimated at \$681,940. Since the benefits attributable to the improvement are entirely commercial in nature, the entire cost of construction as well as all future maintenance costs will be borne by the Federal Government.

The recommendation is made subject to the conditions that local interests will:

- (1) Provide, maintain and operate without cost to the United States, an adequate public landing with provisions for the sale of motor fuel, lubricants and potable water open and available to the use of all on equal terms.
- (2) Provide without cost to the United States all necessary lands, easements and rights-of-way required for construction and subsequent maintenance of the project including suitable dredged material disposal areas with necessary retaining dikes, bulkheads and embankments therefor.
- (3) Hold and save the United States free from damages that may result from construction and maintenance of the project.
- (4) Accomplish without cost to the United States alterations and relocations as required in sewer, water supply, drainage and other utility facilities.
- (5) Assume full responsibility for all project costs in excess of the Federal cost limitation of \$2,000,000.
- (6) Establish regulations prohibiting the discharge of untreated sewage, garbage, and other pollutants in the waters of the harbor users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

Acknowledgement and Identification of Personnel

This report was prepared under the supervision and management of the following New England Division personnel:

Colonel C. E. Edgar, III, Division Engineer
Colonel Max B. Scheider, Division Engineer, Retired
Colonel William E. Hodgson, Jr., Deputy Division Engineer
Joseph L. Ignazio, Chief, Planning Division
Donald W. Martin, Chief, Coastal Development Branch
Robert C. MacDonald, Chief, Small Navigation Projects Section

The study and report was developed by Steven Andon, Project Manager in the Small Navigation Projects Section. Richard Ring, Regional Economist, prepared the economics material; Diana Platt, Geographer, prepared the Social Assessment; and Gilbert Chase, Marine Resources Specialist, prepared the Environmental Assessment. Assistance in the development of this study was also rendered by Mark Habel, Assistant Project Manager.

New England Division is appreciative of the cooperation and assistance rendered in connection with this study by personnel of other Federal offices and agencies; by State, regional and municipal authorities, and members of the Corea Harbor Lobstermen Co-op.

COREA HARBOR
GOULDSBORO, MAINE

DETAILED PROJECT REPORT

PROBLEM IDENTIFICATION

APPENDIX 1

Prepared By:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

PROBLEM IDENTIFICATION
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PROBLEM IDENTIFICATION
SECTION A
ANALYSIS OF EXISTING CONDITIONS AND TRENDS

1. This appendix contains information supplementing the first two sections of the Main Report, Introduction and Problem Identification. It describes previous studies and reports, describes the existing and projected future (without project) conditions, identifies problems and sets forth the national objectives, the planning objectives and constraints as developed for this project.

Prior Studies and Reports

2. Federal interest in Corea Harbor dates back to 1911. Several studies and reviews have been conducted since then, in an effort to determine and develop the harbors potential. A list of House Documents related to Corea Harbor and a brief description of each is provided in Table 1-1.

Table 1-1
Prior Studies and Reports

<u>Published In</u>	<u>Nature of Report</u>	<u>Work Considered and Recommendation</u>
H. Doc. No. 425, 62nd Cong. 2nd Ses.	Report accomplished under authority of River and Harbor Act of June 25, 1910.	Dredging select areas within the harbor to a depth of 6 feet MLW. Unfavorable.
H. Doc. No. 1003 65th Cong. 2nd Ses.	Report accomplished under authority of River and Harbor Act of August 8, 1917.	Construction of an anchorage basin to 6 feet MLW. Favorable.
H. Doc. No. 27, 74th Cong. 1st Ses.	Report accomplished under House Resolution adopted April 13, 1934 under Section 3 of the River and Harbor Act of June 13, 1902.	Construction of an anchorage basin 600 feet long by 400 feet wide with a MLW depth of 8 feet. Favorable.

3. As a result of the 1934 Resolution, the anchorage area became a Federally authorized project in 1935, as shown on Figure 1-1. Construction of the project was completed in September 1938.

4. In June 1977, at the request of local officials the New England Division of the U.S. Army Corps of Engineers prepared a Small Boat Navigation Project Reconnaissance Report to determine the need for further detailed study of navigation improvements in Corea Harbor. The reconnaissance report set forth a conceptual plan for expanding the existing

anchorage and channel. The proposed project consisted of a 3 acre anchorage extension and an increase in width of the existing natural channel to a minimum of 60 feet for a length of 2,000 feet from the anchorage to the west of Western Island. The depth would be 6 feet throughout.

5. The reconnaissance report indicated that the project would have a benefit/cost ratio of 1.9 to 1 and recommended that further detailed study be undertaken.

Location

6. Corea is one of seven villages which comprises the town of Gouldsboro, Maine, as shown on Figure 1-2. It is located in Hancock County and is situated southwest of Gouldsboro Bay, on the end of Dyer Neck. Geographically, the village is located 130 miles northeast of Portland, Maine, and 55 miles southeast of Bangor, Maine. Access to the village is provided by Maine Route 195.

Existing Conditions

7. Corea Harbor is formed by an indentation in a point of land surrounded by Gouldsboro Bay to the northeast, the Atlantic Ocean to the south, and Prospect Harbor to the southwest. Three islands, Bar Island, Outer Bar Island, and Western Island, form the southeasterly boundary of the harbor, with the entrance to the harbor facing the south. There is a bar connecting Bar Island to the mainland, at Youngs Point, which is passable only 65 percent of the time.

8. The geology of the study area generally consists of bedrock overlain by shallow deposits of peat, sands, and gravels. There are several isolated marine deposits and clays, located north, south and west of the village.

9. Strong southerly winds in excess of 21 knots occur fairly evenly throughout the year. Very heavy weather conditions of extreme winds, waves and surge occur during northeasters. Strong southerly winds often precede the classical northeast winds associated with a northeaster.

10. Currents within the harbor area are relatively small. Maximum currents outside the harbor area average 3 to 5 knots. The shoreline is principally weathered bedrock with sand beaches in the island cover and a sand bar between Bar Island the mainland. There is a mud flat at the northeast portion of the inner harbor.

11. The water quality of Corea Harbor is very high. The waters just outside the harbor, in the area of Bar Island, are class SA, the highest quality designated by the Maine Department of Environmental Protection (DEP). There is a small freshwater brook that runs into the head of the harbor. This brook is too small to warrant a DEP Classification but has a very clean appearance.

FIGURE 1-1
EXISTING FEDERAL
MOORING BASIN
5.5 ACRES
COMPLETED 1938

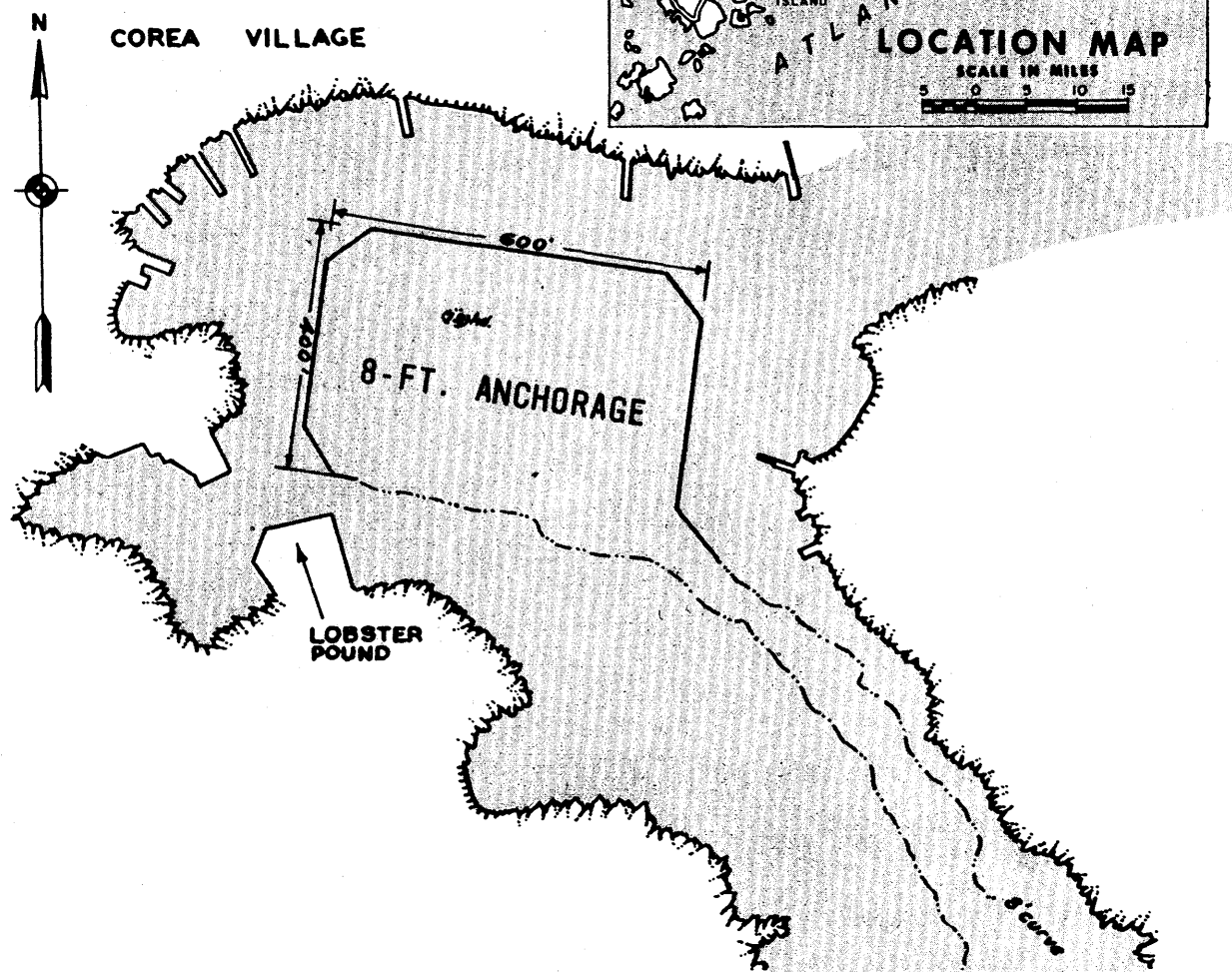


FIGURE 1-1
COREA HARBOR
MAINE

30 SEPTEMBER 1976

SCALE IN FEET
100 0 100 200 300 400 500

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

12. The project area has a tidal range of 10.5 feet and can be located on Coastal and Geodetic Survey Map #305 titled "Tibbet Narrows to Schoodic Island," and U.S.G.S. map titled "Petit Manan Point, ME."

Population

13. The U.S. Census recorded the population of Gouldsboro in 1970 at 1,310, a 19.1 percent growth over the 1960 population of 1,100. Decades prior to 1960 showed a fluctuating population. Between 1960 and 1970 Gouldsboro's population growth exceeded the growth experienced by Hancock County by close to three times. Nineteen-eighty population estimates provided by the Maine State Planning Office indicate a growth of 13.0 percent for Gouldsboro from 1970. Seasonal estimates show that Gouldsboro experiences an influx of approximately 1,100 people during the summer. Population figures for the town and county are provided in Table 1-2.

Table 1-2
Population
Gouldsboro and Hancock County, Maine

<u>Year</u>	<u>Gouldsboro</u>	<u>Percent Change From Preceding Decade</u>	<u>Hancock County</u>	<u>Percent Change From Preceding Decade</u>
1930	1,115		30,721	
1940	1,068	- 4.2	32,422	5.5
1950	1,168	9.4	32,105	- 1.0
1960	1,100	- 5.8	32,293	6.0
1970	1,310	19.1	34,590	7.1
1980*	1,480	13.0		

Source: 1930-1970, U.S. Census
1980, Maine State Planning Office

14. Although no official count has been taken, the population in the village of Corea is estimated to be 220 on a year-round basis.

Housing

15. Data from the Hancock County Planning Commission indicate a total of 630 year round housing units in Gouldsboro in 1975. Eighty percent of these structures were single-family units, 18 percent mobile homes with the remainder duplexes and mixed residential-commercial structures. Housing units by types are presented in Table 1-3.

Table 1-3

Housing Units by Type
Gouldsboro, Maine 1975

<u>Type</u>	<u>Units</u>	<u>Percent of Total</u>
Single Family	506	80.3
Duplex	2	0.3
Multi-Family	00	0.0
Mobile Homes	110	17.5
Mixed Res./Comm.	<u>12</u>	<u>1.9</u>
TOTAL	630	100.0

16. Of the 630 year-round housing units, 520 or 82.5 percent were rated standard condition with 70 (11.1 percent) deteriorated and 40 (6.4 percent) dilapidated. In addition to the year-round housing stock, Gouldsboro has a significant number of summer residences. Nineteen seventy-five figures indicate a total of 112 summer homes, with recent housing development being mostly seasonal units.

Economy

17. The average number of firms in Gouldsboro in 1977 was 20, (with an average number of employees of 273), according to data provided by the Hancock County Planning Commission. The major employers include Stinson's Cannery which processes sardines and other seafood items and Elscott Manufacturing which produces electronic components.

18. The resident labor force averaged 778 between January 1979 and December 1979, with 692 employed. This yielded an unemployment rate of 11.1 percent for that year. Many of the 692 employed are self-employed, the majority of which make their living as fishermen or clamdiggers. A small number work in local mills as woodcutters producing crates and lobster traps. Two navy facilities dealing in radio communications and astronautics provide jobs for other Gouldsboro residents. Some residents work outside Gouldsboro traveling as far as Ellsworth to do so.

Land Use

19. Gouldsboro's area totals 32,225 acres or 50.4 square miles, with 96.8 percent (31,198 acres) land and 3.2 percent (1,027 acres) water. As indicated in Table 1-4, resource production accounts for close to 90 percent of the total acreage. This includes farm (blueberry) lands, areas in commercial forestry production, and shellfish fisheries. However, 95 percent of the acreage devoted to resource production has been designated other forest land.

Table 1-4
Land Use
Gouldsboro, Maine 1978

<u>Categories</u>	<u>Acres</u>	<u>Percent of Total</u>
Residential	1,815	5.6
Trans./Comm./Util.	169	0.5
Services	471	1.5
Resource Production	28,648	88.9
Other	95	0.3
Water	1,027	3.2
TOTAL	32,225	100.0

Source: Hancock County Planning Commission

20. Residential development is the second largest land use with 5.6 percent of Gouldsboro's area. This development is concentrated in seven villages and scattered along the main roads in Gouldsboro.

21. Land-use in the village of Corea is characterized as scattered residential areas on the inland sections of the village and strictly commercial around the periphery of the harbor.

22. Plate 1-3 shows the location of Corea Harbor, as well as a general outline of the facilities that exist there at the present time.

23. Located on the eastern shoreline of the harbor is a well established cooperative organization, Corea Lobster Co-Op Inc., established in 1972, which provides its present members, totalling 44 in number, with an outlet for the marketing of lobsters and scallops and additional facilities. The physical facilities of the co-op include a dock located on the northeast side of the harbor channel, with associated facilities for maintaining an inventory of lobsters, scallops and lobster bait. There are three connected buildings totalling approximately 1,000 square feet and a sales office.

24. Located around the periphery of the anchorage are 12 wood structure piers, typically measuring 50-70 feet long, and 10-12 feet wide which are used to store and work on lobster gear.

25. Opposite the co-op is a docking facility/boat yard owned and operated by an independent boat builder.

26. Table 1-5 shows the total pounds, by month, of lobsters landed by Corea lobstermen and sold through the Fishermen's Co-op since 1970.

Present Navigation

27. Existing navigation facilities consist of a five and a half acre anchorage, dredged by the U.S. Army Corps of Engineers in 1938. The anchorage measures 600 feet long, 400 feet wide, with a depth of 8 feet MLW.

28. The existing fleet is comprised of 40 permanent moorings within the anchorage, all of which are privately owned. The number of vessels moored varies throughout the year from about 30-50. Table 1-6 lists the 40 boats that were permanently moored at Corea Harbor during the year 1979.

29. Vessel trips through the harbor average approximately 210 inbound, 210 outbound in 1977, and approximately 196 inbound and 195 outbound in 1978, accounting only for vessels with drafts of 4 feet or less.

COREA LOBSTER CO-OPERATIVE MONTHLY LOBSTER POUNDAGE TOTAL SINCE ITS INCEPTION IN OCTOBER OF 1970
TABLE 1-5

[illegible]

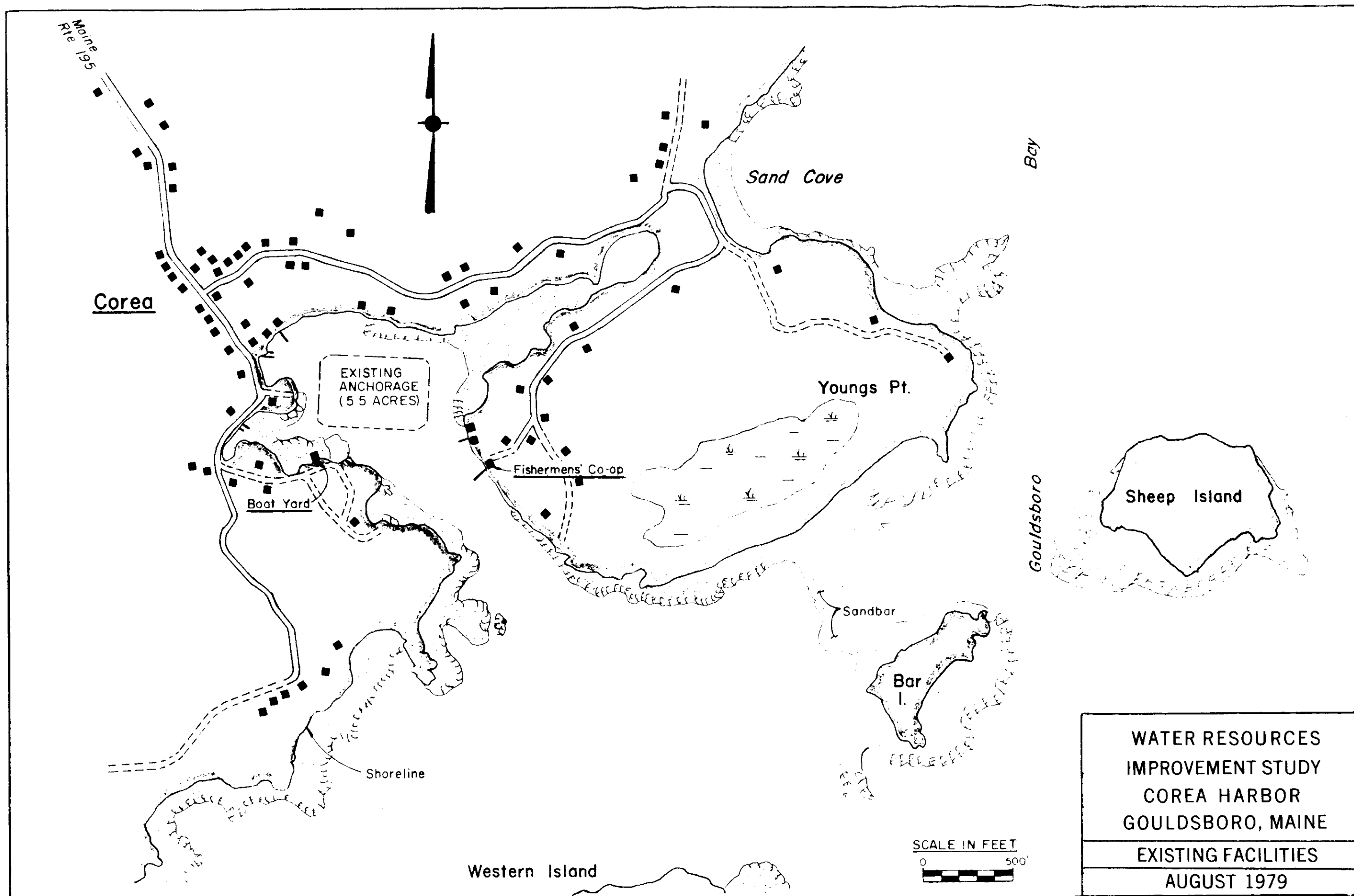


FIGURE 1-3

TABLE 1-6
CHARACTERISTIC OF 1979 COMMERCIAL
FISHING FLEET
COREA HARBOR, MAINE

<u>Name of Owner</u>	<u>Length</u>	<u>Principle Type of Construction</u>	<u>Gear</u>
Herman Anderson	34'	wood	lobster pot
Allison Bishop	38'	fiberglass	lobster pot
Ellis Bishop	38'	fiberglass	lobster pot
Earl Briggs	37'	fiberglass	lobster pot
Jerome Briggs	24'	fiberglass	lobster pot
Arthur Clark	32'	wood	lobster pot
Bowen Calwell	24' skiff	wood	lobster pot
Byron Calwell	28'	wood	lobster pot
Charles Calwell	36'	fiberglass	lobster pot
Don Calwell	37'	wood	lobster pot
Gilbert Calwell	35'	wood	lobster pot
Bruce Crowley	37'	fiberglass	lobster pot
Galen Crowley	30'	fiberglass	lobster pot
Harold Crowley	36'	fiberglass	lobster pot
Monroe Crowley	21'	fiberglass	lobster pot
Victor Crowley	30'	wood	lobster pot
Gregg Dunbar	38'	fiberglass	lobster pot
Ray Dunbar, Jr.	32'	wood	lobster pot
Ray Dunbar, III	33'	fiberglass	lobster pot
Larry Jordan	37'	fiberglass	lobster pot
Mike Lights	32'	wood	lobster pot
Holly Myrick	28'	wood	lobster pot
Steward Northup	38'	fiberglass	lobster pot
Galen Rulen	37'	fiberglass	lobster pot
Volney Stewart	35'	wood	lobster pot
Dana Tracy	36'	fiberglass	lobster pot
Duane Urguhart	21'	fiberglass	lobster pot
Gene Simons	21'	fiberglass	lobster pot
Hildreth Urguhart	36'	fiberglass	lobster pot
Howard Urguhart	30'	fiberglass	lobster pot
Leonard Urguhart	30'	fiberglass	lobster pot
Robert Warford	36'	fiberglass	lobster pot
Robert Warford, Jr.	16' skiff	aluminum	lobster pot
Earnest Woodard	32'	wood	lobster pot
Thomas Bridges	37'	fiberglass	lobster pot
Jack Young	37'	fiberglass	lobster pot
Joe Young	28'	wood	lobster pot
Vincent Young	34'	wood	lobster pot
Roy Sedfield	37'	fiberglass	lobster pot
James Lowe	38'	fiberglass	lobster pot

The Without Federal Project Condition

30. Several issues were considered in the development of the without project condition or the "most probable future." Various scenarios of possible future conditions were considered and are presented below. Maintenance of the existing Federal anchorage was subject of a June 1980 study which recommended continued Federal involvement is a given element within all scenarios.

Alternative Futures

31. Scenario 1: This scenario reflects conditions to remain much as they are today. Approximately 40 fishermen would continue to base their operations in Corea Harbor. Some fishermen would replace their older craft with slightly larger vessels. Although there would be no additions to the existing fleet, damages would increase with the larger vessels. The co-op would continue to operate at its current level which is below capacity. Other than the possibility of a potential new buyer opening the currently closed buying station opposite the co-op, no significant expansion of facilities or operations would occur.

32. Scenario 2: This scenario suggests a reduced fleet. Smaller boats in the existing fleet would cease their operations. The vacated moorings would be occupied by larger boats on a "lose 2, replace 1" type of arrangement. Some fishermen investing in larger boats would relocate their new craft in another harbor to avoid damages and reduce navigational difficulties. Although the fleet may be reduced as much as 50 percent, the reduction in landings would not be as great. The co-op would continue to operate close to its present level.

33. Scenario 3: Small fishing boats would no longer be feasible. All fishing operations would cease in Corea, except for a handful of fishermen operating marginally. Fishermen desiring larger craft would establish operations in more attractive harbors. The co-op would phase out its operation. Local economic activity would decline and year-round population in the village of Corea would decrease.

34. Scenario 4: All fishermen would relocate or cease their operation. The development of summer residences throughout Gouldsboro would continue with many homes in Corea Village being used seasonally. The harbor would be utilized by small recreational craft with supporting commercial development along the shorefront.

35. Scenario 5: A combination of State, local and private interests would make some needed improvements in the harbor. Some increase in anchorage size would be provided, permitting fleet expansion and a reduction in damages. Improved channel conditions would allow safe and easy navigation resulting in increased fish landings. The economic efficiency of the Corea Harbor fishing industry would be improved.

Evaluation

36. A continuation of the present conditions and trends as in Scenario 1 does not appear to be likely in the long term. Many fishermen would relocate to other ports as shoaling and fleet damages continued to increase. Landings would remain low due to shortened fishing hours caused by an ever increasing dependance on tidal conditions to navigate the harbor. Under these conditions it is unlikely that any new buyers could be attracted to the harbor.

37. An eventual development of Corea Harbor for recreational boating after the decline of commercial fishing as in Scenario 4 is relatively unlikely. The same natural conditions which presently make expansion of commercial fishing operations infeasible would also make recreational boating unattractive in Corea. The shore-based commercial development necessary to make a harbor attractive to recreational boaters does not presently exist. Furthermore, examination of the recreational boating demand in the study area indicated that development of recreational boating and related shore facilities would be impractical. The capital investment which would be required to initiate such development is not presently available within the Corea community.

38. It is unlikely that State, local, or private interests would provide the capital investment necessary to provide improvements to Corea Harbor as stated in Scenario 5. The availability of such initial investment to the Corea community is unlikely given the present declining condition of the local economy.

Most Probable Future

39. The "most probable future" derived from these alternative futures is a combination of Scenarios 2 and 3. The major components of this future would be a reduced fleet and overall decline of the fishing industry in Corea Harbor.

40. With no additional anchorage space, the harbor would continue to be utilized below its potential capacity. Overcrowded conditions would persist for a time with collision damages continuing. Although eventual relocation of some vessels may reduce the damages, replacement with larger vessels could sustain the overcrowded condition.

41. The poor channel conditions would continue to threaten safe navigation. Two-way traffic would not be accommodated. Tidal navigation would be required with use of larger vessels, increasing lost fishing time and reducing landings. The desired development of a finfishing industry would not occur.

42. Therefore, as smaller fishing craft become more impractical to operate, fishermen would invest in and relocate larger craft. The loss of the fleet would threaten the economic viability of the harbor as it loses its relative attractiveness to surrounding ports. It is anticipated that

the co-op would eventually be phased out. Although population trends are expected to show continuing growth, it is likely that this growth will continue to be an older population retiring in Gouldsboro.

Problems

43. The problems, needs and opportunities of the study area are directly related to commercial fishing activity within Corea Harbor. Existing navigation facilities are inadequate to safely and economically accommodate the existing fleet. Improvements are needed to alleviate navigation difficulties and damages presently experienced by fishermen operating from Corea. Although the problems may be summarized as overcrowding within the harbor, several areas of difficulty may be identified.

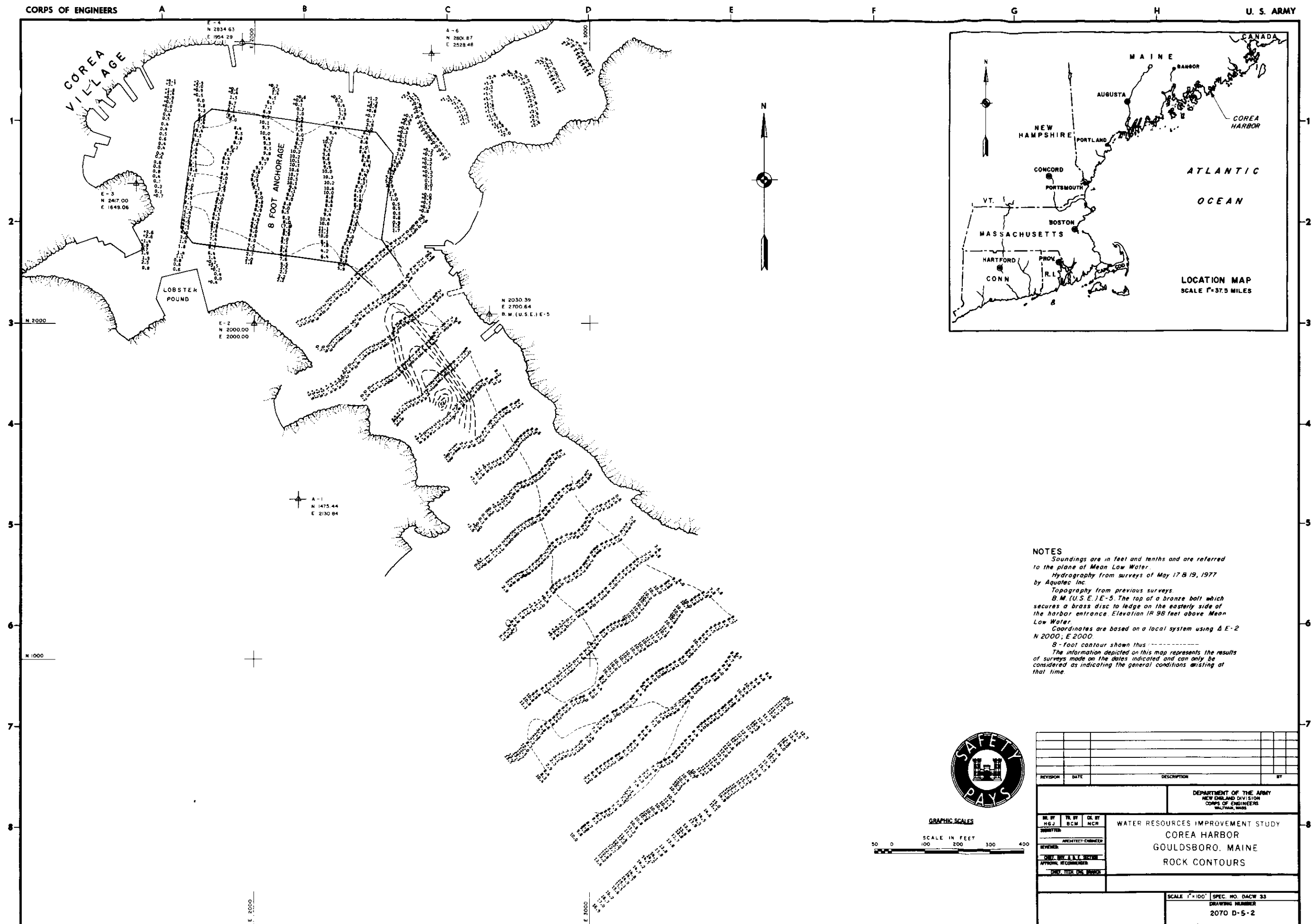
44. Overcrowding is evident within the harbor. The existing five and one-half acre anchorage can safely moor a capacity of thirty-five 30-40 foot fishing vessels. The current fleet, however, consists of 40 of these vessels with an additional four 16-foot skiffs. Consequently, the lack of adequate anchorage area results in minor vessel damages due to chafing.

45. The lack of sufficient water depths during periods of low tide compels most vessels to wait for adequate depth prior to unloading their catch, thus causing a considerable delay to the fleet and negating a possible growth potential within the harbor, e.g., finfishing.

46. Considerable quantities of ledge outcroppings exist within the harbor. The extent of ledge outcropping in the access channel is illustrated on Plate 1-4. The ledge outcroppings are concentrated along the southern shoreline of the entrance to the existing anchorage. The existence of ledge outcroppings into the channel reduces available channel width to the detriment of two-way navigation. Vessels utilizing the channel must take extreme caution to avoid colliding into the ledges, which generally results in slight delays and more importantly a threat to safe navigation. The lobstermen's cooperative and its dock are situated in the southeastern areas of the harbor, on the eastern limit of the access channel. Vessels offloading at the dock present a hazard to navigation in the channel especially at lower stages of the tide. This hazard is further compounded by the ledges mentioned above which lie immediately opposite the co-op.

47. Corea Harbor is exposed to open seas in the southerly direction. During periods of high winds and attendant waves, vessels moored within the harbor are highly vulnerable to wave related damages. Amplifying this hazard further is the overcrowding within the harbor. Congested conditions result in severe quantifiable damages during stormy weather conditions.

48. Inadequate navigation facilities prohibit Corea's fishermen from expanding their operation into other fisheries, e.g., finfish. Existing facilities are too small to safely and economically harvest these fisheries. Furthermore, existing facilities do not allow for use of larger vessels, or additional vessels, large or small.



49. The bar which extends between the mainland and Bar Island is impassible at low tide. During times of moderate to heavy seas it is dangerous to enter and leave the harbor via the open sea between the mainland and Western Island. There are no islands or other obstructions to protect boats from high seas coming in from the open Atlantic. During periods of high tides, boats can gain access to Corea Harbor via a safer route, northeast between the mainland (Young's Point) and Bar Island. However, the bar prevents use of this passage for approximately 35 percent of the time. The dredging of a channel through this bar would enable many more hours of use of this access route to Corea Harbor.

Needs

50. The needs of the community as developed through the identification of the problems are evident. Based upon the previously outlined navigational difficulties, the needs of the community are defined as follows: expansion of the existing anchorage area to safely accommodate the existing and future fleet of the study area; provide for adequate and efficient accessibility of the anchorage area and harbor entrance at all tides; e.g., channel dredging and provide adequate wave protection to lessen the possibility of wave-related vessel damages.

Opportunities

51. Improvements to facilitate navigation in Corea Harbor would provide for increases in the efficiency of existing commercial fishing activities. Channel deepening in conjunction with the provision of additional anchorage areas would allow for maximum development of available fishery resources.

52. Improvements in the navigational conditions would afford increases in harbor utilization and navigation safety while alleviating property damages. Implementation of harbor modifications would provide the means for Corea's fishermen to maintain their competitive position and also a stimulus for expansion of the fishing fleet operating out of the harbor.

SECTION B
PLANNING OBJECTIVES AND CONSTRAINTS

National Objectives

53. Planning for navigational improvements in Corea Harbor is based in part on national objectives of economic development and enhancement of environmental quality. Section 103 of the Water Resources Planning Act of 1965 directed the National Water Resources Council to establish principles and standards for planning Federal and Federally-aided water resource projects. In 1973, the council published Principles and Standards for Planning Water and Related Land Resources which provides the broad policy framework for planning activities. The Standards provide for uniformity and consistency in comparing, measuring and judging the beneficial and adverse effects of alternative water resource improvement projects. The purpose of the Principles and Standards is to promote the quality of life by planning for the attainment of the following objectives.

National Economic Development (NED)

To enhance national economic development by increasing the value of the nation's output of goods and services and improving national economic efficiency.

Environmental Quality (EQ)

To enhance the quality of the environment by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural resources, cultural resources and ecological systems.

Planning Constraints

54. Planning constraints are those parameters which can place limitations on any proposed plan of improvement. As limitations, they are used to direct plan formulation and restrict impacts cutting across a broad spectrum of concerns. These concerns may include natural conditions within the project site, technological states of the art, economic limits, and legal restrictions.

55. This study has identified through consultation with Government agencies and local businesses a number of concerns, but only three issues may be identified as constraints.

56. The following planning constraints were identified with respect to the Corea Harbor project:

57. Bottom dragging operations are conducted in the Corea Harbor area wherever a sandy bottom is encountered. Dragging in areas of rocky bottom can cause extensive damage to fishing gear and result in lost fishing time

and decreased catch. Care must be taken to limit disposal of ledge material to areas where bottom dragging operations are not likely to occur. If ledge or rock were disposed of at sites where dragging operations are conducted, interruption of trawling activities and damages to fishing gear could be disposed of in an area of naturally rock bottom.

58. Any sediment removed from Corea would contain pollutants which may have an adverse impact on the offshore environment beyond the boundaries of the disposal site. The disposal site must be selected so as to minimize adverse environmental impacts. Any selected ocean disposal site must be as suitable as possible for rapid and permanent settling of the dredged material. Therefore, bottom current velocities must be minimal to avoid the transport of dredged materials. The disposal area must also have as minimal a slope as possible so as to avoid slump or other movement of the spoil pile which could cause release of contaminants to the water column and/or the surrounding environment. The nature of the present natural bottom sediments at the dumpsite must conform as closely as possible with the physical characteristics of the dredge spoil to be dumped. This will ensure the quickest possible rebound of the dumpsite environment to its natural state subsequent to disposal operations.

59. The third and final constraint identified is to avoid any adverse impacts on the marine resources both within Corea Harbor and the surrounding waters. Any attempt to develop Corea Harbor in such a way, or to such an extent as to allow the local fishing fleet to disrupt or deplete the existing marine resources would be detrimental to the long term utilization of the harbor.

60. As stated earlier in this section, consultations with interested parties determined a number of concerns which should be identified and addressed. The concerns identified are explained below:

61. In order for Corea Harbor's commercial fishing interests to maintain suitable stable markets for their catch they must be able to deliver a constant supply. Any disruption of fishing and commercial operations could discourage some buyers from doing business with Corea Harbor's commercial concerns. Therefore, dredging and disposal operations must not interfere with any commercial fishing operations in the project area.

62. The economies of all the nearby harbors are based on the same source of income as Corea Harbor, i.e., commercial fishing operations. These communities must not be put into a position of having to compete for the available fisheries and their livelihood. The enhancement of Corea's economy through expanded commercial fishing activities must not be at the expense of the economies of the other commercial fishing harbors in the area. The improvements in Corea Harbor must not be so extensive as to adversely impact on the economies of any other fishing ports.

63. Corea Harbor has only one outlet to the sea, the natural channel leading to open water at the southern side of the harbor. Suspended sediments and pollutants are all flushed out to sea through this opening

with each passing tide. Dredging operations within the harbor will greatly increase the turbidity of the water and would release some pollutants presently trapped in the sediment. Water quality within the harbor will temporarily decline during dredging operations. Construction of navigational improvements must be scheduled in such a way so as to insure the most advantageous level of tidal flushing action and thereby provide the best possible water quality during dredging operations.

64. Conducting dredging activities during unfavorable weather conditions can be dangerous and costly. Operation of dredging and blasting equipment must not be undertaken during adverse weather conditions. Disposal of dredged material during stormy weather can damage the environment in the vicinity of the disposal site through inaccurate dumping and increased area of dispersion of the spoil due to turbulence.

65. A variety of environmental concerns are associated with dredging of the harbor. Lobsters, which are the major source of Corea's income, inhabit the muddy areas of the harbor bottom where they can most easily construct their burrows. Dredging of any area will destroy these and any other benthic organisms in the area to be dredged. The proposed anchorages and channel are in area with sandy bottoms or in the intertidal zone, while the lobster population mainly inhabits the more finely grained bottom in the existing anchorage area. For this reason it is not expected that dredging operations will have a significant adverse impact on the lobster population.

66. Construction of any breakwater structure and dredging of the north-eastern anchorage extension will result in the removal of 1.8 acres of the intertidal zone. However, because of the very limited amount of area available for dredging within the harbor this is considered to be minimal.

67. The Maine Historical Preservation Commission has identified one significant prehistoric archaeological site located on Young's Point near the proposed dredging of the bar between Bar Island and the mainland. This concern has been addressed in the "Environmental Assessment" section of this report.

68. Another concern associated with the dredging of the thoroughfare channel between Bar island and the Young's Point headland is the loss of Bar Island as an easily accessible recreation area. Presently, Bar Island, which is privately owned, is used as a recreation area by the public, with the owner's consent, chiefly for hiking and sunbathing. Access to the island is gained by crossing the sandbar from the mainland by foot at lower stages of the tide. Dredging of the thoroughfare channel would limit access to Bar Island to boaters.

Planning Objectives

69. Planning objectives for this study were established after analyzing the identified constraints and concerns regarding the use of water and related land resources in the study area. The purpose of these planning

objectives is to translate identified needs, opportunities, and problems into specific objectives for the study. Planning objectives, as set forth herein, will be used in conjunction with planning constraints in the development of alternate plans that properly address area problems and needs. The establishment of clearly defined planning objectives is also essential in evaluating the various plans that have been studied. The relative merit of each plan is determined, in great part, by the degree to which it addresses and fulfills each planning objective.

70. Based on the discussions of problems, needs, and opportunities previously presented, three planning objectives have been identified as important guidelines to formulation and evaluation of plans to meet the area needs and study objectives.

- . Contribute to the safe mooring of commercial fishing vessels in Corea Harbor, during the 1980-2030 period of analysis.

- . Contribute to the safe navigation of commercial fishing vessels in Corea Harbor, during the 1980-2030 period of analysis.

- . Contribute to the diversification of existing and future harbor resources and facilities devoted to the utilization of commercial fisheries during the 1980-2030 period of analysis.

71. Consideration of these objectives and planning constraints led to the formulation of detailed alternative plans that will be presented in the following appendix.

COREA HARBOR
GOULDSBORO, MAINE

DETAILED PROJECT REPORT

FORMULATION, ASSESSMENT AND EVALUATION OF DETAILED PLANS

APPENDIX 2

Prepared by
Department of the Army
Corps of Engineers
New England Division

FORMULATION, ASSESSMENT AND EVALUATION OF DETAILED PLANS

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SECTION A

FORMULATION, ASSESSMENT AND EVALUATION OF DETAILED PLANS

1. The formulation of a plan of improvement for Corea Harbor has followed the procedures of the Water Resources Council Principles and Standards. Local needs and objectives were identified and project-specific planning objectives and constraints were established. These planning objectives and constraints were considered in the formulation of detailed plans, as were the national objectives of National Economic Development (NED) and Environmental Quality (EQ).

FORMULATION AND EVALUATION CRITERIA

2. Detailed technical, economic and environmental criteria were applied in the formulation and evaluation of the alternative plans. These criteria reflect quantitative measures of the plans performance in relation to the national and local planning objectives and planning constraints. These criteria, which are described below, are utilized in the System of Accounts to evaluate the detailed alternative plans.

TECHNICAL CRITERIA

3. The following technical criteria were adopted for use in formulating preliminary plans:

- The plan must be consistent with local, regional and State goals for growth of commercial fisheries.
- The plan must provide a protective balance between accommodations for fishing vessels and the availability and productivity of fishing resources.
- The plan must provide for the safe utilization of Corea Harbor facilities and protection of boats while on moorings.
- The plan should incorporate dimensions to accommodate expected vessels. There should be sufficient area for maneuvering boats, as well as the development of shore facilities.

ECONOMIC CRITERIA

4. The economic criteria are as follows:

- Maximize net benefits (project benefits minus project costs).
- Minimize local cost of the project.

- Maximize net benefits to the town of Gouldsboro and the commercial interests based in Corea Harbor.
- Minimize potential development costs of locally funded expansion of commercial activities, such as the locally planned development of finfishing activities.
- Minimize adverse impacts of dredging and disposal operations on the commercial fishing industry.

ENVIRONMENTAL CRITERIA

5. The environmental criteria are as follows:

- Minimize volume of dredge material in order to reduce problems relating to the disposal of dredged material.
- Minimize removal and alteration of intertidal areas to avoid impacts.

SOCIAL AND CULTURAL CRITERIA

6. The social and cultural criteria are as follows:

- Maximize safety and ease of navigation to existing and future commercial fishing vessels.
- Minimize impacts on archaeological sites (Young's Point) and recreational areas (Bar Island).

SECTION B

POSSIBLE SOLUTIONS

7. Possible solutions to the problem of overcrowding in the Corea Harbor anchorage and the mobility to further develop potential fishing resources include utilizing existing conditions (no improvement option) or developing new facilities.

NO IMPROVEMENT OPTION

8. It is extremely unlikely that needed improvements to Corea Harbor would be made without Federal participation. It is likely that Corea Harbor would deteriorate if improvements are not made. Vessels would be forced to await favorable tides in order to navigate the entrance channel because of continued shoaling. Development of new commercial operations would not be possible considering the already overcrowded conditions within the harbor. As fish piers and associated new facilities are built at other Maine harbors, fishermen are likely to move away from Corea Harbor. This would lead to a decreased catch for the harbor as a whole. Eventually, the competitive edge which the fishermen at Corea Harbor have built up, due to their ability to provide sufficient catch volume to command long-term supply agreements at a premium price, could be lost.

9. With no improvement, investment in larger boats to be based at Corea Harbor would be impractical. The short range and limited catch ability of the smaller boats presently used at Corea would make their continued operation economically impractical. Fishing concerns wishing to stay in business by investing in new and larger vessels would be forced to move to alternative harbors. However, none of the nearby harbors with facilities comparable to those at Corea Harbor have sufficient room to accommodate extra vessels and increased commercial operations without themselves having to undergo improvements to navigation or expansion of related shore based facilities.

10. Six alternative harbors were evaluated for their possible use for relocation of portions of the Corea Harbor commercial fishing fleet. Two of these, Schoodic Harbor and Prospect Harbor, were chosen because of their close proximity to Corea. The other four, Jonesport, Winter Harbor, Union River at Ellsworth, and Southwest Harbor were chosen because of their comparable size and facilities.

Jonesport Harbor

11. Jonesport is the nearest harbor of comparable size east of Corea. It is located in Washington County on the north side of Moosabec Reach, approximately 25 miles northeast of Corea. Like Corea, the town of Jonesport depends almost entirely upon commercial fishing for its existence. There are currently 59 commercial fishing vessels based in Jonesport. There is, at present, no protected anchorage to accommodate the

commercial fleet. Consequently, most boats are moored in the open off of privately maintained wharves, where they are subject to damage from storm generated wind and waves. Ice floes enter the harbor unhindered in the winter causing much damage to moored vessels and presenting a hazard to navigation.

12. Jonesport is currently home to three boat building firms and five fishing companies. This area has been recently identified by the Federal Economic Development Administration as an area of persistent and substantial unemployment.

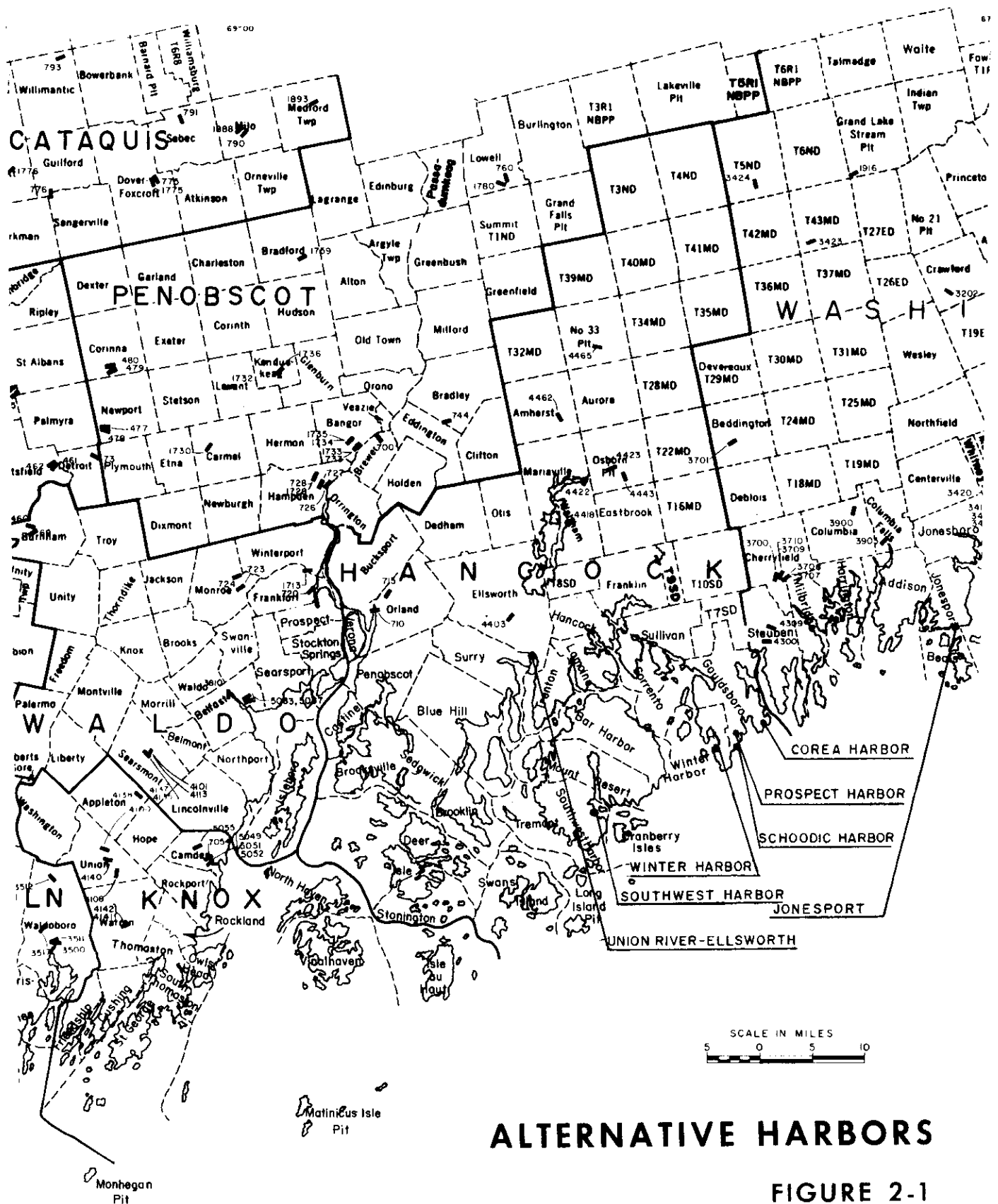
13. A Federal navigation improvement project at Jonesport is currently under study to address these problems. It recommends construction of an access channel, anchorage area, and a breakwater at a cost of over six million dollars. These improvements have been designed to accommodate the existing commercial fishing fleet and a modest increase over the expected project life. New vessels are expected to be added to the fleet in order to take advantage of the new 200 mile limit law.

14. Clearly any increase in fleet size and commercial activity at Jonesport as a result of a transfer of vessels from Corea Harbor would be to the detriment of Jonesport as it would only tend to compound the harbor's present problems. Therefore the designation of Jonesport as an alternative base for commercial fishing activities at Corea Harbor is impractical.

Prospect Harbor

15. Prospect Harbor is located in Gouldsboro on the east side of the Schoodic Peninsula about five miles south of Corea Harbor. It is the closest harbor to Corea considered as an alternative base for Corea Harbor's commercial fishing fleet. Prospect Harbor is presently utilized as a base of fishing operations by four to six lobster boats as a permanent mooring area. The harbor is almost totally unprotected from the same southerly and southeasterly wind and waves which cause damage at Corea Harbor. A Corps of Engineers survey report of Prospect Harbor completed in 1964 found that construction of breakwaters at the Inner Harbor to be economically justified but did not recommend construction due to the inability of town authorities to meet requirements of local cooperation. Additionally the related shore facilities necessary to accommodate an increased fleet do not exist and would require a large local investment to develop.

16. A number of improvements to both navigation and shore facilities would be a prerequisite to relocation of any portion of the Corea fleet to Prospect Harbor. Therefore the use of Prospect Harbor as an alternative base of commercial fishing operations for a relocated Corea Harbor fleet is considered impractical.



ALTERNATIVE HARBORS

FIGURE 2-1

Schoodic Harbor

17. Schoodic Harbor is located in the town of Gouldsboro on the eastern side of Schoodic Peninsula, about 10 miles southwest of Corea Harbor. There are at present no commercial fishing or recreational boating activities based in Schoodic Harbor. The harbor, like Corea and Prospect Harbors, is unprotected from southerly and southeasterly wind and waves. Improvements to navigation and shore facilities would be necessary in order to relocate any of the Corea Harbor fleet at Schoodic Harbor. Therefore, Schoodic Harbor does not appear to be a practical alternative port.

Southwest Harbor

18. Southwest Harbor, is located on western Mount Desert Island, about 30 miles west of Corea Harbor by sea. Southwest Harbor is larger in size than Corea and is base to a more diversified commercial fishing industry. For shore facilities Southwest Harbor has a privately operated lobster pier and wharf, a town operated dock, landing and ramp, five boat yards and marinas with over 70 moorings. There is also an operational U.S. Coast Guard station on the north side of the harbor and a seafood processing plant on the western side.

19. Because of its increasing popularity as a recreational harbor in addition to its expanding commercial operations, Southwest Harbor is presently operating at the limit of its vessel capacity. Any substantial increase in the commercial fleet from relocating Corea Harbor vessels would result in overcrowding and present a hazard to navigation. In addition, because of the large size of Southwest Harbor's existing commercial fishing fleet, any increase in operations, especially lobster catches, could conceivably place a strain on this resource in the Southwest Harbor area. Therefore relocation of any substantial portion of the Corea Harbor commercial fishing fleet to Southwest Harbor is considered impractical.

Union River

20. Union River is located in Ellsworth, 30 miles northwest of Corea Harbor. An existing Federal project consists of a six foot channel, 100 feet wide, extending from deep water in Union River Bay, 3.5 miles upriver to the city of Ellsworth. Maintenance of the existing project has been discontinued due to a lack of economic justification. For this reason a great deal of dredging would be necessary to restore the project to its authorized depth and deepen it to the eight feet necessary to accommodate any relocated Corea Harbor vessels. Therefore Union River is considered impractical for use as an alternative harbor.

Winter Harbor

21. Winter Harbor is located in Hancock County on the western side of the Schoodic Peninsula about 9 miles west of Corea Harbor. The principal industry, as at Corea, is fishing. A minor tourist industry helps to

support a yacht club located in the Inner Harbor. A public pier and landing, and a commercial fish co-operative wharf are also located in the Inner Harbor, along with a private marina with repair facilities and 15 moorings. At present approximately 40 commercial fishing vessels are based in the harbor.

22. A Detailed Project Report for navigation improvements at Winter Harbor was published by the Corps of Engineers in August 1974. It recommended enlarging the Federal project to 6.5 acres of anchorage at eight feet mlw. Construction was completed in 1975 at a cost of about \$163,000. The project was constructed to alleviate overcrowding within the harbor and reduce ice damages. The Federal improvement was designed only to accommodate the existing commercial and recreational fleet.

23. Transfer of Corea Harbor vessels to Winter Harbor would only result in a return to the previous overcrowding conditions and resulting damages. Relocation of any portion of the Corea fleet to Winter Harbor is therefore considered impractical.

DEVELOP NEW FACILITIES

24. The development of new facilities at Corea Harbor is considered to be the most satisfactory means for meeting the needs of fishermen who use Corea Harbor as a base of operations. In order to develop detailed improvement plans, a plan formulation rationale was developed and alternative plans were conceived to meet project objectives while conforming to identified project constraints.

PLAN FORMULATION RATIONALE

Characteristics of the Existing Commercial Fishing Operations

25. The numbers, sizes, and types of vessels presently using Corea Harbor were identified along with recent catch statistics. Factors which limit optimum utilization of the harbor by the existing fleet were also identified and quantified. These estimates and procedures are set forth in Appendix 5.

Factors Effecting Commercial Growth

26. The factors affecting the growth and diversification of the commercial fishing operations in Corea Harbor were identified and quantified. Local interests have planned to increase commercial finfishing operations. The number of new vessels engaging in this activity which could reasonably be expected to move into Corea Harbor and their requirements for facilities was determined. The procedures for development of these estimates are set forth in Appendix 5.

Establish Required Anchorage Depths and Areas

27. The amount of mooring area necessary to alleviate overcrowding within the existing project and provide for the safe and efficient operation of both the existing fleet and future vessels was determined. A depth of six feet mlw in the additional anchorage areas was determined to be adequate. Existing vessels drawing less than six feet could occupy the anchorage extension thereby opening space in the existing eight foot basin for deeper draft vessels, both existing and future.

Establish Required Channel Dimensions

28. The most desirable channel dimensions were found to be a depth of eight feet, to correspond with the maximum existing mooring basin depth, and a width of 100-feet to provide the safest possible operating conditions. The best channel alignment was determined to be a straight line running from the southeast corner of the existing mooring basin to the eight foot mlw contour outside of the harbor. This alignment follows the natural eight foot channel at both ends. The middle section of the channel crosses over a ledge which would have to be removed. Avoiding the ledge entirely would not be possible and aligning the channel more to the east at that point would place it alongside the offloading area of the lobstermen's co-op wharf, presenting a safety hazard and precluding two way navigation.

Establish Need for Protection

29. During periods of high tide, waves may roll into Corea Harbor unobstructed from the south-southwest. These waves entering the anchorage area can cause damage to moored vessels by forcing them against one another or by breaking mooring lines.

DESCRIPTION AND EVALUATION OF DETAILED PLANS

Plan A

30. Plan A, as shown in Figure 2-2, would entail the dredging of an additional 1.5 acres of anchorage area to a depth of 6-feet below mlw in the area to the northeast of the existing Federal mooring basin.

31. The area to be dredged is presently almost entirely within the intertidal zone. Dredging of this area would, therefore, remove 1.5 acres of intertidal environment from Corea Harbor.

32. Plan A requires the removal of 14,230 cubic yards of mud, sand, and gravel for the anchorage.

33. Cost estimates for Plan A are summarized in Table 2-1. Plan A is estimated to have an initial cost of \$168,300 and would result in annual net benefits of \$66,900.

34. Since the area of the harbor considered in Plan A is removed from the operational areas of the harbor, Plan A will minimize adverse impacts on health and safety during dredging operations. By alleviating present overcrowded conditions within the harbor, Plan A would enhance safe operation of the Corea Harbor commercial fishing fleet and reduce delays due to navigating the crowded harbor.

35. Plan A would provide an anchorage area which is more sheltered from wind and waves entering the harbor from the south than the existing mooring basin.

Table 2-1
Plan A Project Cost Estimates

Dredging 14,350 c.y. @ \$8.95/c.y.	\$128,400
Contingencies (15%)	19,300
Engineering and Design (8%)	10,300
Supervision and Administration (8%)	10,300
TOTAL FIRST COST	<u>\$168,244</u>

Plan A Annual Charges

Amortization (7-3/8%)	\$ 12,800
Maintenance Dredging	2,400
TOTAL ANNUAL COST	<u>\$ 15,200</u>

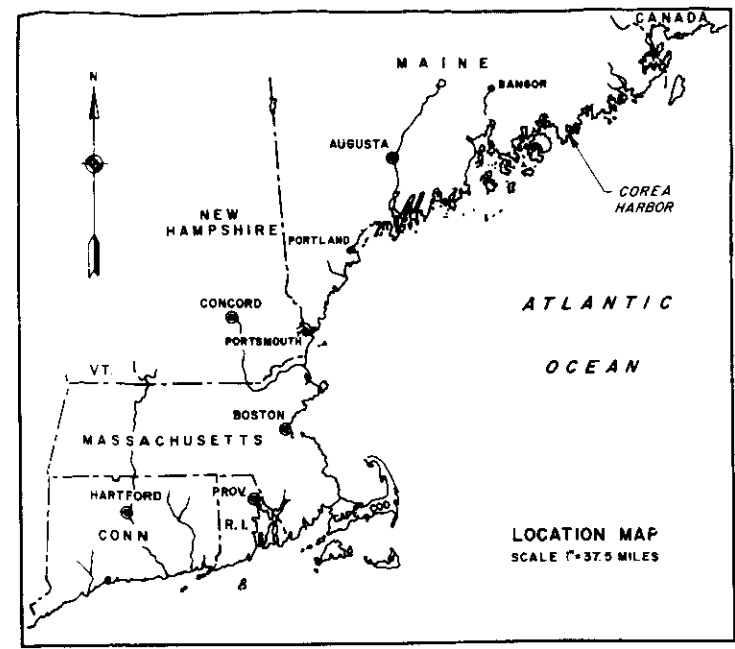
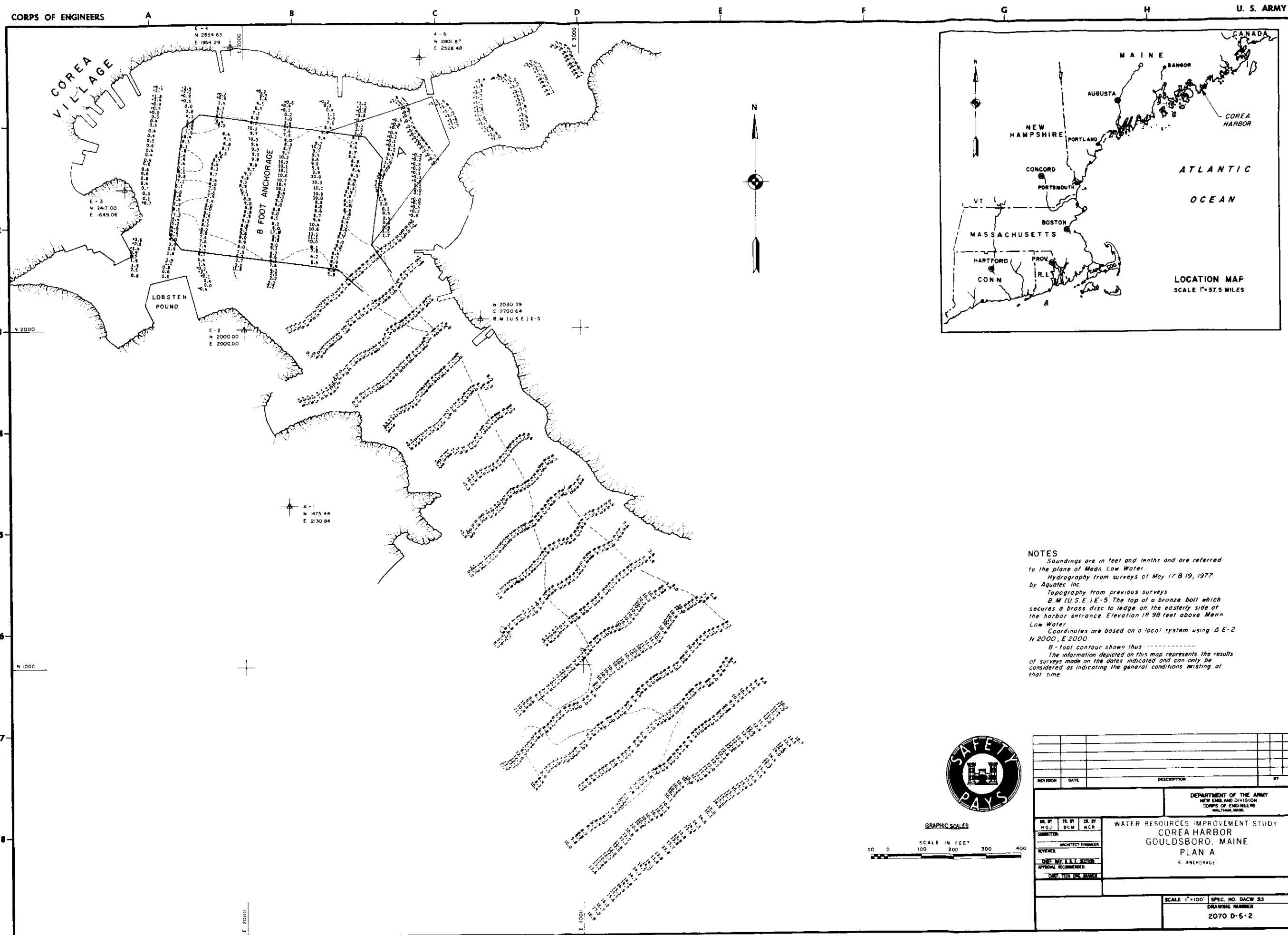
Plan B

36. Plan B, as shown in Figure 2-3 involves the dredging of an additional 1.5 acres of anchorage area to a depth of six feet mlw in the area immediately to the south of the existing Federal mooring basin. The plan also includes removal of ledge rock and dredging of an entrance channel to the harbor with a depth of eight feet mlw and a width of 100 feet for a distance of 2,000 feet terminating at the southeast corner of the existing mooring basin. Various widths were considered for the entrance channel from 60 to 100 feet. Selection of the 100-foot dimension was made in light of safety considerations. These are discussed in detail in Appendix 5.

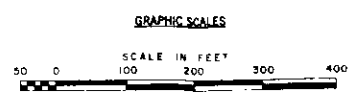
37. Plan B will require navigation aids to mark the ends of the channel and mark the ledge area.

38. Cost estimates for Plan B are summarized in Table 2-2. Plan B is estimated to have an initial cost of \$582,400, and would result in annual net benefits of \$78,000.

39. There are two advantages to Plan B over Plan A, while both Plans A and B provide the additional anchorage area necessary to alleviate overcrowding of the existing fleet, the area to be dredged in Plan B does not include any portion of the intertidal zone and, therefore, minimizes



NOTES
Soundings are in feet and fathoms and are referred to the plane of Mean Low Water.
Hydrography from surveys of May 17 & 19, 1977 by Aquatic, Inc.
Topography from previous surveys.
B.M. (U.S.E.) E-5. The top of a bronze bolt which secures a brass disc to ledge on the easterly side of the harbor entrance. Elevation 19.98 feet above Mean Low Water.
Coordinates are based on a local system using Δ E-2 N 2000, E 2000.
8' fath contour shown thus: -----
The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at that time.



REVISION				DATE	DESCRIPTION	BY
<div>DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS WALTHAM, MASS.</div>						
DESIGNED BY H.G.J.		TR. BY DCM		CHECKED BY NCR		<div>WATER RESOURCES IMPROVEMENT STUDY COREA HARBOR GOULDSBORO, MAINE PLAN A 8' ANCHORAGE</div>
SUBMITTED		ARCHITECT/ENGINEER		REVIEWED		
APPROVED		CHIEF, CIVIL & ENVIRONMENTAL ENGINEERING		CHIEF, TECHNICAL SERVICES		
APPROVAL		RECOMMENDED		CHIEF, CIVIL & ENVIRONMENTAL ENGINEERING		
SCALE 1"=100'				SPEC. NO. DACW 33		
DRAWING NUMBER				2070 D-5-2		

FIGURE 2-2

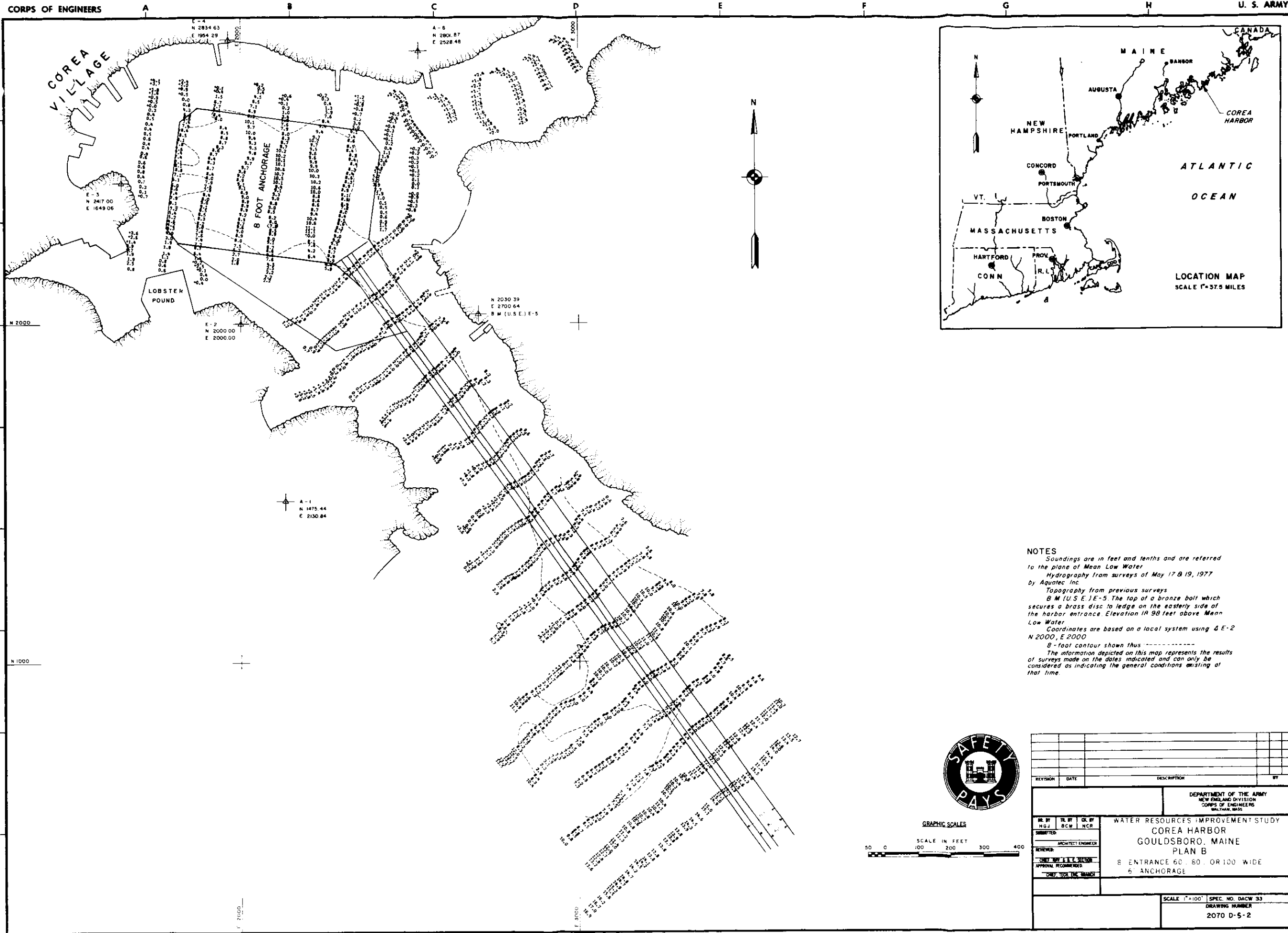


FIGURE 2-3

the effects of dredging in this environment. Plan B also includes the entrance channel which enhances the safe operation of vessels using the harbor.

40. The disadvantage of Plan B as opposed to Plan A is the removal of ledge rock (140 c.y.) necessary to construct the southern anchorage and the exposure of vessels using the southern anchorage to wind and waves entering the harbor from the south.

41. Plan B would involve the removal of 12,510 c.y. of sediments and 140 c.y. of rock to create the southern anchorage extension, and 4,010 c.y. of sediments and 2,530 c.y. of ledge to construct the entrance channel. This gives a total volume of 16,520 c.y. of sediments and 2,670 c.y. of ledge for Plan B.

Table 2-2
Plan B Project Cost Estimates

Dredging 16,520 c.y. of sediment @ \$8.95/c.y.	\$147,900
2,670 c.y. of ledge @ \$110.00/c.y.	293,700
Contingencies (15%)	66,200
Engineering and Design (8%)	35,300
Supervision and Administration (8%)	35,300
Aids to Navigation	4,000
TOTAL FIRST COST	<u>\$582,400</u>

Plan B Annual Charges

Amortization (7-3/8%)	\$ 44,200
Maintenance Dredging - 165 c.y./y.r. @ 15.70/c.y.	2,600
Maintenance of Aids to Navigation	1,000
TOTAL ANNUAL COST	<u>\$ 47,800</u>

Plan C

41. Plan C involves the combination of both Plans A and B. Plan C, as shown in Figure 2-4, involves the dredging of both the 1.5 acre anchorages in addition to the entrance channel.

42. The benefits of Plan C over both A and B are that while both A and B provide additional anchorage area to alleviate overcrowding in the existing mooring basin, only Plan C provides enough additional space to accommodate the expanded finfishing operations planned by local concerns. Plan C also provides the entrance channel necessary to enable the harbor to accommodate these expanded operations safely and efficiently.

43. Plan C entails the same disadvantage as Plan A in that it involves the removal of 1.5 acres from the intertidal zone within Corea Harbor. Plan C also entails the same disadvantages as Plan B in that it

involves the removal of rock ledge and the southern anchorage would be exposed to wind and waves entering the harbor from the south.

44. Plan C requires the removal of 2,670 cubic yards of ledge and the dredging of 30,870 cubic yards of sand, gravel, and mud.

45. Cost estimates for Plan C are summarized in Table 2-3. Plan C is estimated to have a total initial cost of \$681,900, and would result in annual net benefits of \$144,900.

46. Plan C will require the same navigational aids listed in Plan B. Dredging operations would have a temporary adverse impact upon the safety of commercial operations within the harbor because of the presence of dredging equipment in the channel area.

Table 2-3
Plan C Project Cost Estimates

Dredging 30,870 cy of ordinary material @ \$7.25/cy	\$223,800
2,670 cy of ledge @ \$110.00/cy	293,700
Contingencies (15%)	77,600
Engineering and Design (8%)	41,400
Supervision and Administration (8%)	41,400
Aids to Navigation	4,000
TOTAL FIRST COST	<u>\$681,900</u>

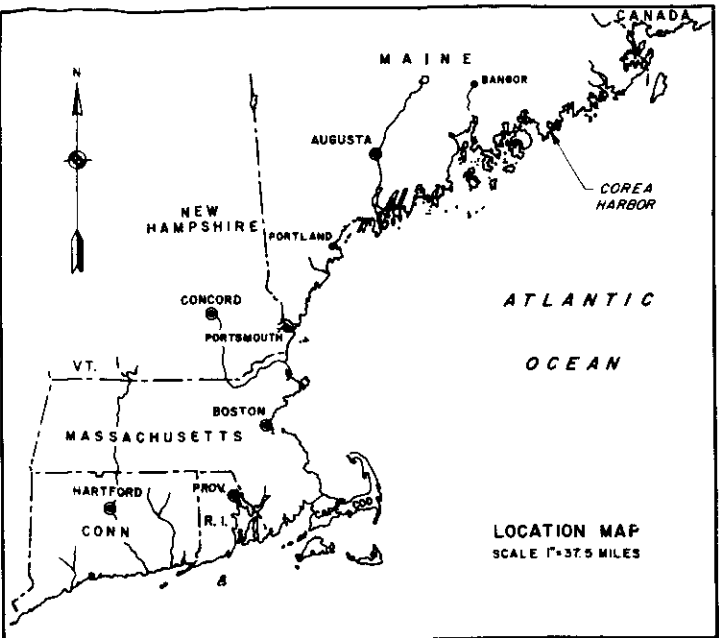
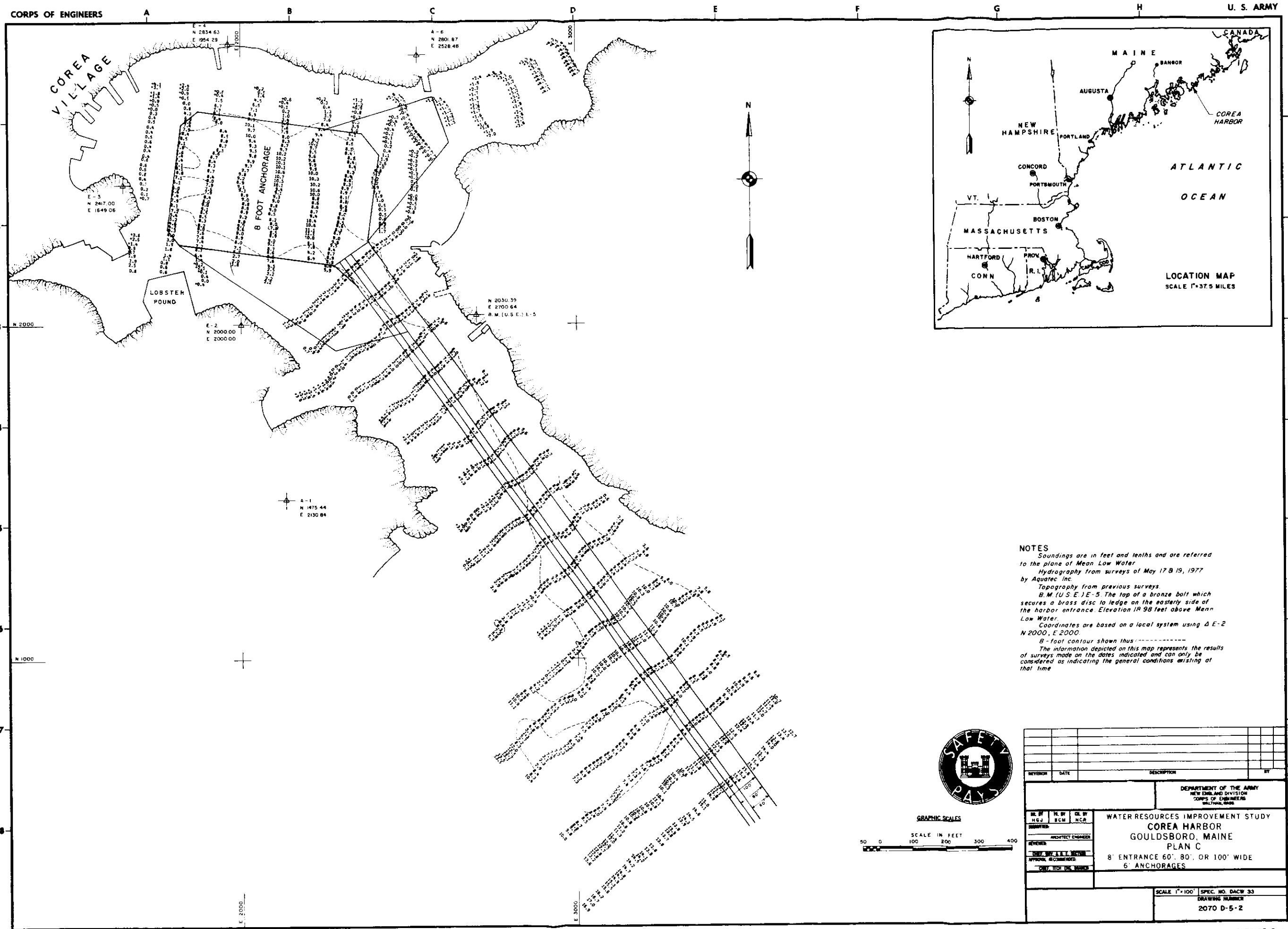
Plan B Annual Charges

Amortization (7-3/8%)	\$ 51,800
Maintenance Dredging - 310 cy/yr @ 12.40/cy	3,800
Maintenance of Aids to Navigation	1,000
TOTAL ANNUAL COST	<u>\$ 56,600</u>

Plan D

47. Plan D, as shown on Figure 2-5, would entail the dredging of a thoroughfare between Bar Island and the mainland. The channel would be approximately 400 feet in length and 60 feet wide with a depth of six feet mlw.

48. The area to be dredged is presently navigable at higher stages of the tide but impassable at lower stages because of the sandbar that has formed between the island and the mainland. Corea fishermen use this passage when tides are favorable to pass between Corea Harbor and the fishing grounds that lie to the east in Gouldsboro Bay. At lower stages of the tide, when this area is impassable, vessels are forced to use the western approach to Corea Harbor which is not protected by any islands and is more subject to high seas.



NOTES

Soundings are in feet and tenths and are referred to the plane of Mean Low Water.

Hydrography from surveys of May 17 & 19, 1977 by Aquatic Inc.

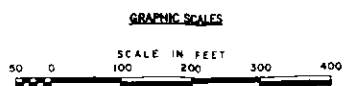
Topography from previous surveys.

B.M. (U.S.E.) E-5. The top of a bronze bolt which secures a brass disc to ledge on the easterly side of the harbor entrance. Elevation 19.98 feet above Mean Low Water.

Coordinates are based on a local system using Δ E-2 N 2000, E 2000.

8-foot contour shown thus: -----

The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at that time.



REVISION				DATE	DESCRIPTION	BY
<div style="display: flex; justify-content: space-between;"> <div> <p>DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS WALTHAM, MASS.</p> </div> <div> <p>WATER RESOURCES IMPROVEMENT STUDY COREA HARBOR GOULDSBORO, MAINE PLAN C 8' ENTRANCE 60', 80', OR 100' WIDE 6' ANCHORAGES</p> </div> </div>						
<p>DR. BY HGU</p> <p>DESIGNED BY HGU</p> <p>REVIEWED BY HGU</p> <p>APPROVAL RECOMMENDED BY HGU</p>	<p>PL. BY BCM</p> <p>CL. BY NCR</p> <p>ARCHITECT ENGINEER</p>	<p>SCALE 1"=100'</p> <p>SPEC. NO. DACW 33</p> <p>DRAWING NUMBER 2070 D-5-2</p>				

FIGURE 2-4

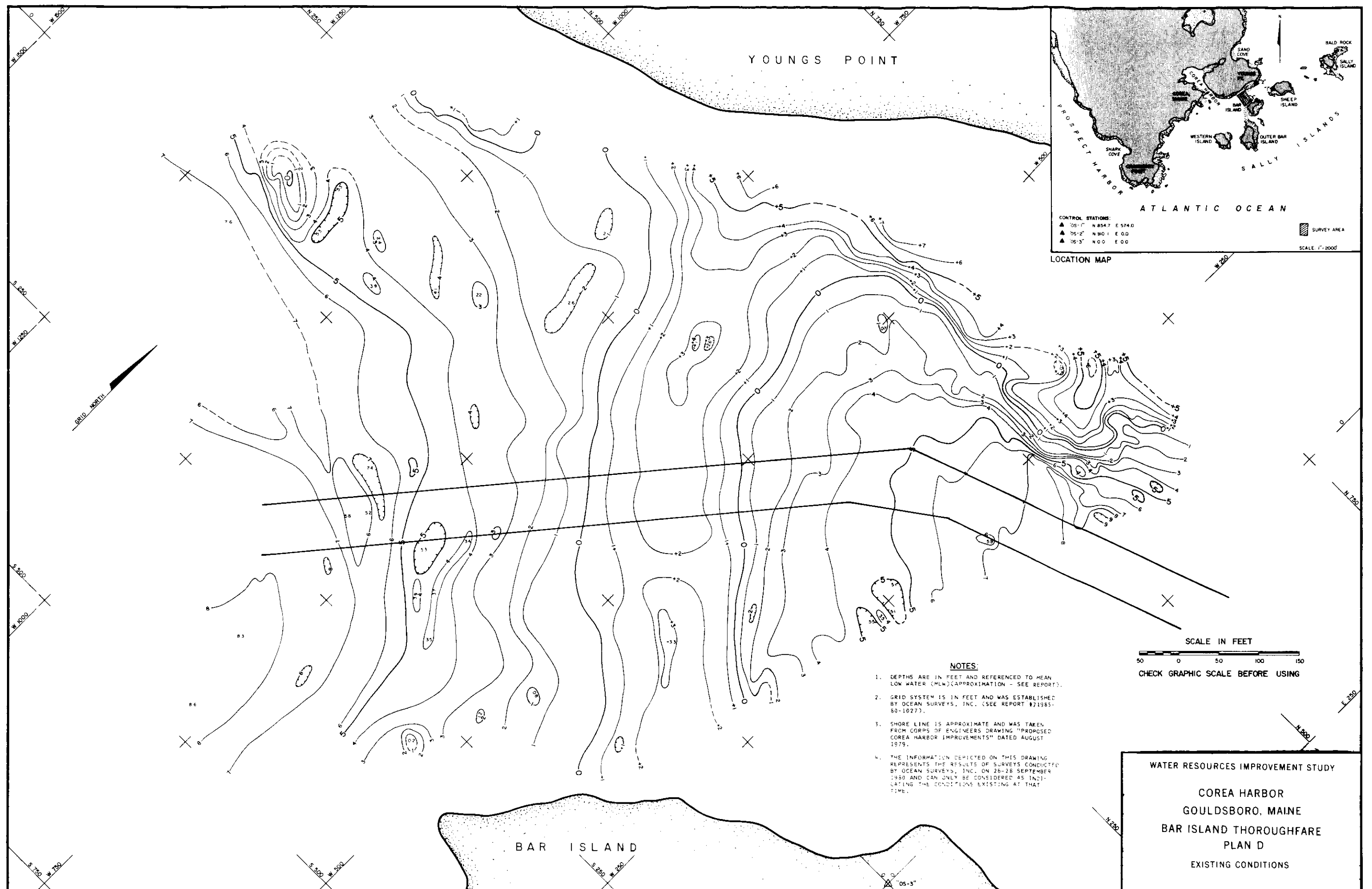


FIGURE 2-5

49. Plan D requires the removal of 1,450 cubic yards of ledge rock and the dredging of 8,950 cubic yards of sediments.

50. Cost estimates for Plan D are summarized in Table 2-4. Plan D is estimated to have an initial cost of \$323,900 and would result in the net benefits of \$14,500 annually.

51. Bar Island is privately-owned and is used as a recreational area chiefly for hiking and sunbathing. Access to the island is, at present, gained by wading across the sandbar and ledge at lower stages of the tide. Approximately 150-200 people make use of Bar Island each year. Dredging of the thoroughfare would limit access to Bar Island to boaters.

52. The Maine Historical Society expressed concern that Plan D might possibly impact upon an identified prehistoric archeological site situation to the northeast of Young's Point. Since Plan D would not in any way affect mean sea level or the existing shoreline, it would not have any impact on this site.

Table 2-4
Plan D - Project Cost Estimates

Dredging 1,450 c.y. of ledge rock @ \$100/c.y.	\$159,500
8,950 c.y. of sand & gravel @ \$8.95/c.y.	80,100
Contingencies (15%)	35,900
Engineering and Design (8%)	19,170
Supervision and Administration (8%)	19,170
Aids to Navigation	10,000
TOTAL FIRST COST	\$323,900

Plan D Annual Charges

Amortization (7-3/8%)	\$ 24,600
Maintenance Dredging - 100 c.y./yr. @ \$19.00/c.y.	1,900
Maintenance of Aids to Navigation	2,000
TOTAL ANNUAL COST	\$ 28,500

Plan E

53. Plan E, as shown in Figure 2-6, involves the construction of a rubble mound breakwater on a ledge at the western side of the entrance to Corea Harbor. The structure would be approximately 200 to 240 feet in length, depending upon the width of the entrance channel, and would be connected to shore at its western end. Based on available wind and wave data, the structure would be designed with a freeboard of ten feet above mlw.

54. The breakwater would be constructed on top of the innermost of two existing natural ledges, and would require the destruction of ledge environment and removal of approximately 0.3 acres of the intertidal zone.

55. The breakwater would protect vessels moored in the existing anchorage area and the anchorage considered in Plan B from heavy wind and waves entering the harbor from the south at higher stages of the tide. At lower levels of the tide the harbor is protected by the two natural ledges on the western side of the entrance. By constructing the breakwater on the innermost ledge, the size of the breakwater can be minimized, since the outer ledge would lessen the height and impact of waves on the inner ledge.

56. Since the breakwater is connected to land at its western end, some of the construction operations could be land based, thereby minimizing unsafe conditions in the channel during construction. Land based operations would necessitate construction of an access road to the site and entail alteration of the terrestrial environment in the immediate vicinity of the site.

57. Cost estimates for Plan E are summarized in Table 2-5. Plan E is estimated to have an initial cost of \$322,400, and would result in annual net benefits of \$20,000.

58. Because of the climate, a timber or concrete structure would require excessive maintenance, therefore, only a rubble mound breakwater design was considered.

59. A large weight armor stone would be utilized on the seaward end of the breakwater since this area would receive the greatest impacts of waves propagating around the outermost ledge. A medium sized armor stone would be used on the remainder of the seaward flank of the structure and a small sized stone would be used on the leeward flank.

60. Because the breakwater is connected to land at its western end it would restrict tidal flushing of the harbor leading to a long-term reduction in water quality. The narrowing of the harbor's only outlet to the ocean would also lead to accelerated build-up of ice within the harbor during winter, and therefore would negatively impact on safety of navigation within the harbor.

61. Plan E would require filling of 0.3 acres of intertidal zone where the breakwater connects to the shore at its western end.

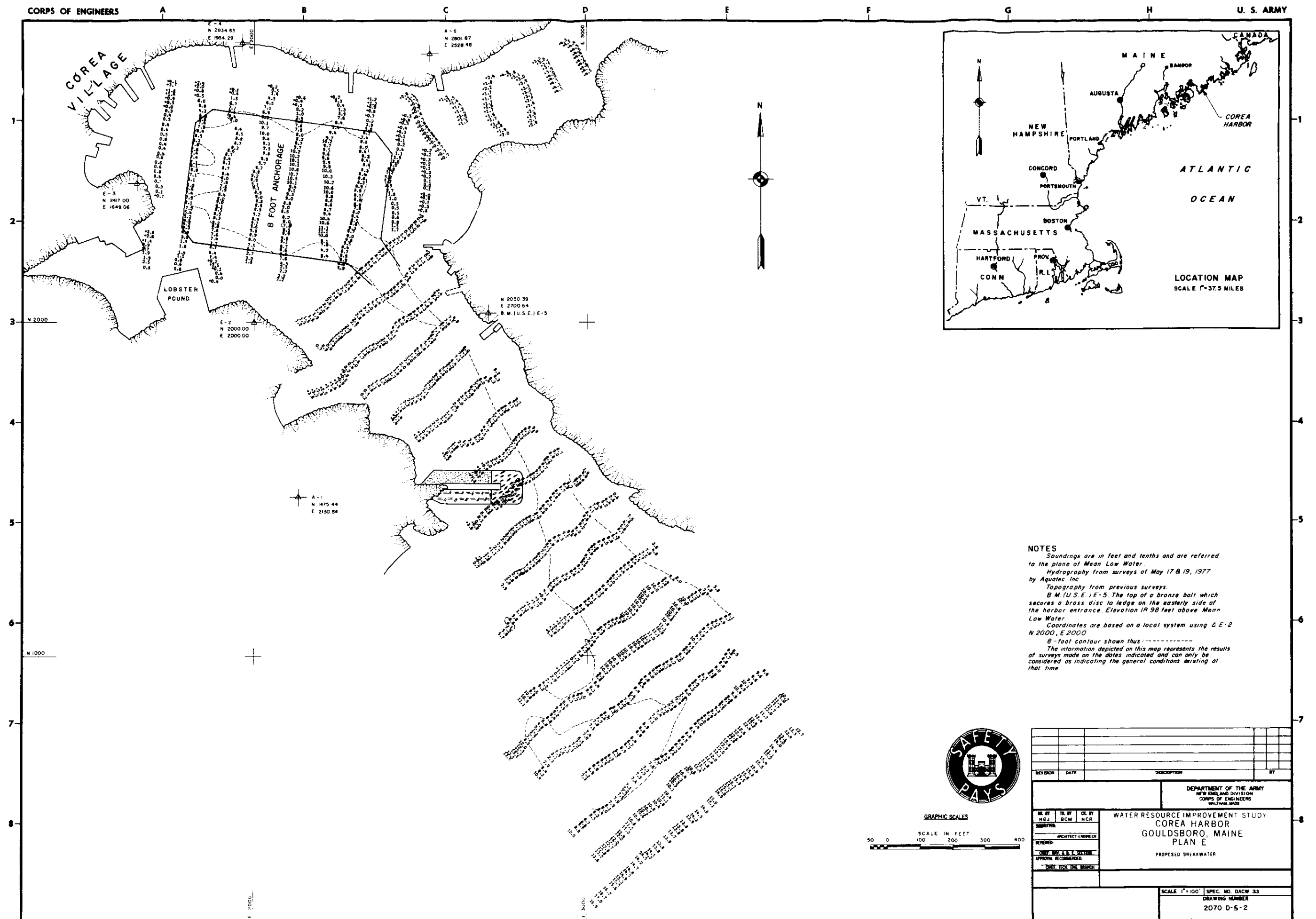


Table 2-5
Plan E - Project Cost Estimates

Armor Stone 2,120 tons @ \$29.00/ton	\$ 61,500
Core and Blanket Stone 6,750 tons @ \$19.00/ton	128,200
Bedding Stone 2,590 tons @ \$21.50/ton	55,700
TOTAL COST OF CONSTRUCTION	<u>\$245,400</u>
Contingencies (15%)	36,800
Engineering and Design (8%)	19,600
Supervision and Administration (8%)	19,600
Aids to Navigation	1,000
TOTAL FIRST COST	<u>\$322,400</u>

Plan E Annual Charges

Amortization (7-3/8%)	\$ 24,500
Maintenance of Breakwater 50 tons of stone/yr @ \$75/ton	3,800
TOTAL ANNUAL COST	<u>\$ 28,300</u>

SECTION C
COMPARISON OF ALTERNATIVE PLANS

62. In general, because of severe overcrowding in the existing mooring basin and the great extent of near-surface ledge rock which limits the area available for new anchorages, there is a direct correlation between net benefits and the amount of dredging.

63. Plan A, while minimizing dredging requirements, has the greatest environmental impacts since almost the entire area to be dredged is within the intertidal zone. Plan A also has the greatest adverse impact on water quality in the harbor during dredging since it does not include increasing the size of the natural channel. While Plan A does alleviate the overcrowding within the harbor, it does not do so to a sufficient extent to allow for future diversification of the commercial fishing fleet. Plan A does provide the maximum amount of protection in the anchorage from wind and waves entering the harbor from the south, since the area to be dredged is situated behind the Young's Point headland.

64. Plan B provides the same degree of relief from overcrowding as Plan A since the amount of area to be dredged is the same (1.5 acres). Plan B minimizes the environmental impacts since none of the area to be dredged for the anchorage is within the intertidal zone. The mooring area in Plan B provides a lesser degree of safety to moored vessels than Plan A since the southern area is directly exposed to southerly wind and waves. Plan B does, however, provide for a greater degree of safety for vessels attempting to navigate the entrance channel which has been deepened and widened.

65. Plan B has a positive impact on water quality in Corea Harbor. By deepening and widening the existing natural channel, Plan B provides for more effective tidal flushing of Corea Harbor which will improve long-term water quality within the harbor. By dredging the entrance channel first, the temporary adverse impact of dredging operations within the harbor on water quality will be minimized.

66. Plan B has greater economic benefits than Plan A since the entrance channel provides easier access to the harbor at all stages of the tide. However, Plan B entails the same disadvantage as Plan A in that it fails to provide sufficient mooring area to accommodate the commercial expansion planned by local concerns.

67. Plan C is a combination of both Plans A and B. Plan C is the only dredging plan which provides sufficient anchorage area to alleviate overcrowding of the existing fleet and accommodate future commercial expansion.

68. Plan C will minimize the adverse impacts on water quality in the harbor during dredging of both anchorage areas since the channel would be dredged first to provide more effective tidal flushing.

69. Plan C involves the same adverse impact through removal of 1.5 acres of the intertidal zone as Plan A.

70. Plan C involves the same temporary adverse impact on safety of navigation in the channel during dredging operations as Plan B, and the same positive long-term impact on safety because of the channel. Channel alignment in Plan C is the same as in Plan B in order to provide for safe navigation in the vicinity of the lobstermen's co-op pier.

71. Plan C, while requiring the greatest amount of dredging, is the plan which provides the greatest net benefits to Corea Harbor's commercial fishing industry.

72. Plan D, which would provide a protected approach to Corea Harbor from the east, was not shown to be economically justified. While benefits would be accrued from increased safety and a lessening of delays due to heavy seas, the amortization of dredging costs would far exceed these benefits.

73. Plan D would also restrict access to a publicly used recreational area (Bar Island) by dredging a channel through the bar which is presently used to gain access to the island.

74. Plan E, which would provide a breakwater on the western side of the entrance to the harbor, was shown not to be economically justified. The benefits derived from a reduction on damages due to heavy southerly winds and waves are far exceeded by the costs of maintenance to the structure and amortization of construction costs.

75. Plan E would also have a negative impact on water quality in the harbor since it would restrict tidal flushing. Since Plan E effectively narrows the harbor's outlet to the sea, it could also contribute to the build up of ice in the harbor in winter, thereby having a negative impact on the safety of navigation in the harbor and the channel.

76. Plan E would also impact negatively on the intertidal zone environment by filling of 0.3 acres of this area where the breakwater connects to shore at its western end.

SYSTEM OF ACCOUNTS

77. The System of Accounts is a summary evaluation required by the Principles and Standards. The System of Accounts provides in a concise format an evaluation of the alternative plans in terms of the national objectives of National Economic Development (NED), Environmental Quality (EQ), national accounts of Social Well Being (SWB) and Regional Development (RD). It also demonstrates plan performance in terms of the planning objectives and constraints; the technical, economic and other criteria, as well as other measures such as plan acceptability.

78. The System of Accounts is shown in Table 2-6. The summary assessments indicate that the plans have varying responses to the different national objectives and accounts. In evaluating all impacts considered, Plan C is shown to be the most favorable option considered.

SELECTING A PLAN

79. Selection of a plan for navigation improvements to Corea Harbor, Maine, has been based on consideration of economic efficiency, preservation of environmental quality, navigational safety, and the needs and objectives of local and State governments. Based on these criteria, Plan C is found to be the overall most favorable plan for meeting the project objectives.

NATIONAL ECONOMIC DEVELOPMENT

80. Of the five alternatives evaluated in this study, Plan C would provide the greatest net benefits. Appendix 5 of this report contains the detailed benefit/cost studies for the five alternatives, including the benefit/cost analysis of the proposed channel dimension. The National Economic Development Plan is the selected plan.

ENVIRONMENTAL QUALITY

81. The Environmental Quality Plan is the alternative which makes the most significant contribution to the management, conservation, preservation, creation, restoration or improvement of the quality of certain natural and cultural resources and ecological systems.

82. Plan B is the environmental quality plan. While it does not entail the least amount of dredging it does not adversely impact on the intertidal zone as does the plan which minimizes dredging (Plan A). Plan B does contribute to a long-term enhancement of water quality in Corea Harbor since the dredging of the channel will provide for more effective tidal flushing. This impact on water quality is also a benefit of Plan C, the recommended plan.

TABLE 2-6
SYSTEM OF ACCOUNTS

	WITHOUT IMPROVEMENT CONDITION	FEDERAL IMPROVEMENT AT COREA HARBOR, GOULDSBORO, MAINE					SITE A Rock Disposal	SITE B Sediment Disposal
		PLAN A Dredge Northeast Anchorage	PLAN B Dredge South Anchorage and Access Channel	PLAN C Dredge Both Plans A and B	PLAN D Dredge Bar Island Thoroughfare	PLAN E Construct Breakwater		
PLAN DATA								
Structures - Federal	NONE	Dredge additional 1.5 acres of anchorage area to 6 feet mlw northeast of the existing Federal anchorage.	Dredge additional 1.5 acres of anchorage area to 6 feet mlw to the south of the existing Federal anchorage and dredge an access channel 100 feet wide, 8 feet mlw, 1200 feet in length.	Combined Plan - Plans A and B dredge access channel and two 1.5 acre anchorages.	Dredge a thoroughfare 60 feet wide, to 6 feet mlw through the ledge and bar between Bar Island and the mainland.	Construct a rubble-mound breakwater 200-240 feet in length on the western side of the access channel.	NONE	NONE
Structures - Local	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
LAND REQUIREMENTS								
Federal	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
Non-Federal	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
NATIONAL ECONOMIC DEVELOPMENT								
Implementation Costs								
Federal		\$168,300	\$582,400	\$681,900	\$323,900	\$322,400		
Non-Federal		0	0	0	0	0		
Quantifiable Total		\$168,300	\$582,400	\$681,900	\$323,900	\$322,400		
Average Annual Benefits								
Reduction of Vessel Damages While Moored		\$ 9,600	--	\$ 9,600	--	\$ 9,600		
Reduction of Lost Fishing Time		10,400	--	10,400	--	10,400		
Increased Lobster Landings		38,700	--	38,700	--	--		
Increased Scallop Landings		8,200	--	8,200	\$ 11,100	--		
Increased Finfish Landings		--	\$ 48,000	48,000	--	--		
Transportation Savings		--	30,000	30,000	3,400	--		
TOTAL BENEFITS		\$ 66,900	\$ 78,000	\$144,900	\$ 14,500	\$ 20,000		
Average Annual Costs								
Amortization of Construction		\$ 12,800	\$ 44,200	\$ 51,800	\$ 24,600	\$ 24,500		
Maintenance Dredging		2,400	2,600	3,800	1,900	--		
Breakwater Maintenance		--	--	--	--	3,800		
Maintain Aids to Navigation		--	1,000	1,000	2,000	--		
TOTAL ANNUAL COSTS		\$15,200	\$47,800	\$ 56,600	\$ 28,500	\$ 28,300		
Benefit-Cost Ratio		4.4	1.63	2.6	0.5	0.7		

N.A. = Non Applicable

TABLE 2-6 (Cont'd)

SYSTEM OF ACCOUNTS

FEDERAL IMPROVEMENT AT COREA HARBOR, GOULDSBORO, MAINE								
WITHOUT IMPROVEMENT CONDITION	PLAN A Dredge Northeast Anchorage	PLAN B Dredge South Anchorage and Access Channel	PLAN C Dredge Both Plans A and B	PLAN D Dredge Bar Island Thoroughfare	PLAN E Construct Breakwater	SITE A Rock Disposal	SITE B Sediment Disposal	
ENVIRONMENTAL QUALITY								
Water Quality								
Increased turbidity at dredge site during construction.	NO	YES	YES	YES	YES	N.A.	N.A.	
Long-term impact on harbor water quality. Effluent discharge at:	UNFAVORABLE	UNFAVORABLE	FAVORABLE	FAVORABLE	NO IMPACT	UNFAVORABLE	N.A.	
Dredge site or disposal site	NO	YES	YES	YES	YES	NO	YES	
Air Quality								
Long Term								
Increased fuel emissions from vessels and vehicles	NO	YES	YES	YES	NO	NO	NO	
Emissions and noise at dredging area or disposal area during construction	NO	YES	YES	YES	YES	YES	YES	
Short term marine odor during dredging and disposal	NO	YES	YES	YES	YES	NO	YES	
Dust and noise at on-shore construction sites	NO	NO	NO	NO	NO	YES	NO	
PLANTS AND ANIMALS								
Aquatic Vegetation Destroyed	NO	YES	YES	YES	YES	YES	YES	
Benthic Fauna Destroyed	NO	YES	YES	YES	YES	YES	YES	
Wildlife Displaced	NO	TEMPORARILY	TEMPORARILY	TEMPORARILY	TEMPORARILY	YES	TEMPORARILY	
Wildlife Destroyed	NO	YES	YES	YES	YES	YES	YES	
Temporary Disruption of Fish Habitat	NO	YES	YES	YES	YES	YES	YES	
Permanent Disruption of Fish Habitat	NO	NO	NO	NO	NO	YES	NO	
Area of Intertidal Zone Removed	NONE	1.5 Acres	1.5 Acres	3.0 Acres	0.3 Acres	0.3 Acres	NONE	
Enhancement of Lobster Habitat	NO	YES	NO	NO	NO	NO	NO	
VISUAL APPEARANCE								
Temporary loss of aesthetics	YES	YES	YES	YES	YES	YES	YES	
Support construction required	NO	NO	NO	NO	NO	YES	NO	
Industrial-commercial development encouraged	NO	YES	YES	YES	YES	YES	N.A.	
Land filling necessary	NO	NO	NO	NO	NO	YES	NO	
Increase vehicle activity in harbor area during construction	NO	YES	YES	YES	YES	YES	YES	
Long term increase in vehicle activity	NO	YES	YES	YES	NO	NO	N.A.	
Archeological and historical value lost	NO	NO	NO	NO	NO	NO	N.A.	

N.A. = Non Applicable

TABLE 2-6 (Cont'd)

SYSTEM OF ACCOUNTS

	WITHOUT IMPROVEMENT CONDITION	FEDERAL IMPROVEMENT AT COREA HARBOR, GOULDSBORO, MAINE					SITE A Rock Disposal	SITE B Sediment Disposal
		PLAN A Dredge Northeast Anchorage	PLAN B Dredge South Anchorage and Access Channel	PLAN C Dredge Both Plans A and B	PLAN D Dredge Bar Island Thoroughfare	PLAN E Construct Breakwater		
<u>SOCIAL WELL-BEING</u> Life, Health and Safety	Continued risk of vessel collisions and hazardous channel conditions.	Increased safety hazards during construction. Reduced collision risk within harbor.	Increased safety hazards during construction. Limited harbor use during blasting procedures. Reduced collisions in south anchorage and provide safer navigation in channel.	Increased safety hazards during construction. Limited harbor use during channel blasting. Reduced collisions in all anchorages and provides safe navigation in channel.	Increased safety hazards during construction. Provides safer navigation in the thoroughfare.	Increased safety hazards during construction. Provides safer conditions by reducing collisions within the protected anchorage.	No Impact	No Impact
Educational, Recreational, and Cultural Opportunities	Limited use of harbor area for recreational purposes.	No Impact	No Impact	No Impact	Loss of limited access to Bar Island via thoroughfare use during low tide periods.	No Impact		
Community Growth (refer also to Regional Growth under RD Account)	Modest population growth as retired people continue to settle in the area. Some reduction in fishing activity.	Slight increase in fishing activities.	Slight increase in fishing activities.	Some increase in fishing activities.	No Impact	No Impact		
Displacement of People	Voluntary relocation of fishermen desiring larger boats and safer anchorage.	Allows some expansion to encourage continuance of fishing activities in Corea Harbor.	Encourages fishermen to remain in corea and expand activities within the harbor.	Provides additional anchorage encouraging use of larger boats in safer conditions.	No Impact	Provides some incentive to remain in Corea Harbor.		
Transportation	Continuance of tidal restraints causing time losses.	Minimal disruption of harbor traffic during construction.	Construction related disruption more critical in channel than in anchorage. Permits two-way traffic in channel and eliminates tidal delay.	Minimal disruption in anchorage areas more critical in channel during construction. Provides for two-way traffic and eliminates tidal delays.	Minor inconvenience to traffic during dredging operations. Provides easy access to eastern waters and Gouldsboro Bay by eliminating tidal constraints.	Some inconvenience to both land and sea traffic during construction.		

N.A. = Non Applicable

TABLE 2-6 (Cont'd)

SYSTEM OF ACCOUNTS

	WITHOUT IMPROVEMENT CONDITION	FEDERAL IMPROVEMENT AT COREA HARBOR, GOULDSBORO, MAINE					SITE A Rock Disposal	SITE B Sediment Disposal
		PLAN A Dredge Northeast Anchorage	PLAN B Dredge South Anchorage and Access Channel	PLAN C Dredge Both Plans A and B	PLAN D Dredge Bar Island Thoroughfare	PLAN E Construct Breakwater		
<u>REGIONAL DEVELOPMENT</u> Regional Growth	Decrease in fleet as small craft become impractical and larger craft can't be safely accommodated in existing anchorages.	Permits slight increase in fleet size (up to 4 boats).	Permits slight increase in fleet size (up to 4 boats). Provides for more efficient channel navigation. Increases potential for finfish landings.	Permits increased fleet. Provides more efficient channel navigation. Encourages development of finfishing industry.	No Impact	Provides protection thereby encouraging fishermen to maintain fishing activities in Corea Harbor.	N.A.	N.A.
Local/Regional Activity	Some decrease in level of activity as overall viability of the harbor declines.	Encourages use of larger craft.	Encourages investment in larger craft. Provides continual access in channel.	Encourages investment in larger craft. Provides continual access in channel.	Gives more fishing time to those utilizing thoroughfare passage.	Reduction in vessel damages while moored.	N.A.	N.A.
Business Activity	Some decrease in level of activity.	Reduction in boat repairs.	Encourages development of a buying station opposite the lobster co-op. Some reduction in boat repairs. Increases efficiency of co-op operation.	Reduction in boat repairs. Encourages commercial shorefront development. Increases efficiency of co-op operation.	No Impact	Reduction in boat repairs and associated costs.	N.A.	N.A.
Related Commercial Development will Increase Tax Revenues	NO	YES	YES	YES	NO	NO	N.A.	N.A.
<u>OTHER EVALUATED CRITERIA</u> Plan compliments other local development plans	NO	NO	YES	YES	NO	NO	N.A.	N.A.
Navigation benefits exceed costs	N.A.	YES	YES	YES	NO	NO	N.A.	N.A.
Plan is acceptable to other Federal agencies								
Plan is acceptable to State agencies								
Plan is acceptable to regional concerns								
Plan is acceptable to municipal authorities								
Plan is acceptable to private concerns								

N.A. = Non Applicable

SECTION D

THE SELECTED PLAN

83. This section describes Plan C, the selected plan of improvement for Corea Harbor. The general environmental impacts of the plan are outlined in this section.

PLAN DESCRIPTION

84. As shown in Figure 2-3, Plan C will consist of widening the existing natural channel to 100 feet at a depth of 9 feet along the entire length (approximately 2,000 feet). Plan C also involves dredging of two anchorage areas, both 1.5 acres in size with a depth of 6 feet. One anchorage would be situated to the northeast of the existing Federal mooring basin and the other would be along the southern side of the existing basin.

85. Dredging of the entrance channel will require blasting and removal of 2,670 c.y. of ledge rock. Table 2-7 summarizes the major features of Plan C.

Table 2-7
Pertinent Data - Selected Plan

Northeast Anchorage	
Area	1.5 acres
Dredge Quantity (sediments)	14,350 c.y.
Depth (mlw)	6 feet
Southern Anchorage	
Area	1.5 acres
Dredge Quantities (sediment)	12,510 c.y.
(rock)	140 c.y.
Depth (mlw)	6 feet
Entrance Channel	
Width	100 feet
Length	2,000 feet
Depth	8 feet
Dredged Quantities (sediment)	4,010 c.y.
(rock)	2,530 c.y.
TOTAL DREDGE QUANTITIES	
(sediment)	30,870 c.y.
(rock)	2,670 c.y.
Maintenance Dredging	
Average Annual	310 c.y.
Over 25 years	7,800 c.y.

OTHER HARBOR IMPROVEMENTS

86. As previously stated, local concerns and officials plan to expand and develop a diversified commercial finfishing industry at Corea Harbor. Channel and anchorage improvements are necessary to encourage commercial expansion which will make use of this available resource. It is expected that four long range offshore finfishing vessels would be attracted to Corea Harbor by the proposed project and the locally planned related shore facilities.

87. Supporting shore industries would be expanded and developed to take advantage of increased finfish landings. Such related industries include fish processing, packing, and transportation. Any expansion of these industries would aid in lessening the severe unemployment being experienced by the Corea community and the area as a whole.

EVALUATED ACCOMPLISHMENTS

88. The evaluated accomplishments that would result from the selected plan of improvements are the benefits that would accrue to the commercial fishing industry of Corea Harbor. The proposed plan would alleviate unsafe and inefficient mooring and navigation conditions within Corea Harbor. The proposed plan would also enable expansion of commercial finfishing operations as planned by local concerns. The selected plan would result in net annual benefits of \$144,900.

89. Other accomplishments which have not been evaluated in economic terms include the long-term enhancement of water quality within the harbor due to the more effective tidal flushing provided by the entrance channel.

CONSTRUCTION AND MAINTENANCE

90. The dredging contract will specify that the contractor form a channel with a minimum depth of 8 feet at mhw with a two-foot allowable overdepth in areas where rock is removed, and a one-foot allowable overdepth where sediments are dredged. Work may have to be scheduled according to the height of the tide. The contract will also specify that the contractor form anchorage areas with a minimum depth of 6 feet and a maximum allowable overdepth of one-foot, and two feet in the area of the southern anchorage where rock is to be removed.

91. Typical equipment that could be used for this project include:

- A three-yard clamshell bucket dredge on a small barge.
- A drill boat and dynamite barge.
- Two 500 c.y. scows.
- One 1,000 HP Tug.
- One 550 HP Tug.
- One launch of indeterminate size.

92. The entrance channel will be dredged first so as to provide for more effective tidal flushing of the harbor, thereby minimizing the adverse impacts on marine life and water quality from dredging operations within the harbor proper.

93. The dredge would work from deep water in either the existing basin or the natural channel. The scows would be floated alongside in the deeper water that would not have to be dredged. Provisions in the construction documents would require that these scows be moved as necessary to avoid interference with commercial activities.

94. Specifications of each plan would indicate types, amounts, and potential sources of construction materials, length of the construction period, and size of temporary work force. These items provide a basis for defining the magnitude of a plan's impacts during construction. Construction related effects generally are short term and site specific.

95. The construction period would not exceed three months for any of the plans. Ten to 30 people would be temporarily employed as a direct result of project implementation.

96. Disposal of the dredged material would take place at sea. Rocky material would be disposal of at a site with a rocky bottom so as not to significantly alter the ocean environment or interfere with dragging operations.

97. The nature of the dredged material is expected to be primarily sandy silt in the northeast anchorage area, silty sand in the southern anchorage area and sand, gravel, and rock in the entrance channel.

98. Maintenance dredging is estimated to be required at 25 year intervals based on a shoaling rate of one percent. This would require removal of approximately 7,800 cubic yards every 25 years. The cost of maintenance dredging, assuming disposal to be at the same site to be used for the improvement dredging, is estimated at \$96,700 every 25 years or approximately \$3,850 each year.

GENERAL IMPACTS OF CONSTRUCTION

99. The construction of the proposed plan will have both temporary and long-term effects on the environment. Short-term effects include air, noise, and water pollution due to the dredging equipment. Long-term effects relate primarily to the alteration of the harbor bottom.

100. Construction operations would disrupt normal commercial operations in the harbor throughout the estimated three month construction period. The presence of barges would hinder normal traffic flow within the harbor area. This would result in a temporary increase in safety hazards and accident risks faced by the fishermen. Temporary removal and relocation of moorings to allow room for operating construction equipment will

result in temporary delays and other disruptions to normal commercial operations.

Blasting Impacts

101. Removal of ledge and boulders would require drilling and blasting with dynamite. The lethality of an explosive is directly related to its detonation velocity, charge weight and the density of the material to be blasted. Most explosives when detonated in a rock or clay substrate produce low level over pressures with subsequent reduced lateral or vertical pressure changes. The confined nature and timing of the detonation will aid in minimizing the overall impacts. Some mitigation measures that can be used include the use of warning charger (dynamite or pulsed electrical currents) outside the perimeter of the proposed work area to scare away any large fish schools or mobile invertebrate animals of fish migration and spawning.

WATER QUALITY IMPACTS

102. Water quality will be temporarily adversely impacted upon at both the dredge site and the disposal sites. These short term impacts include discharges of oil and grease from dredging equipment, increases in turbidity due to dredging and disposal of finer grained sediments, and from the reintroduction of sediment trapped pollutants.

103. Dredging of the entrance channel will increase the effectiveness of tidal flushing of the harbor. By dredging the channel prior to commencement of construction activities within the harbor proper, the adverse effects of dredging on harbor water quality will be minimized.

104. The impacts on water quality of disposal of dredged sediments at the dumpsite are primarily related to short term increases in turbidity during and immediately after disposal. The suspension of fine sediments in the water can have a detrimental effect on shellfish and finfish. By buoying the disposal site and point dumping the spoil the area affected can be minimized. Since the proposed disposal site for sediments is subject only to low current velocities any long term water quality impacts relating to resuspension of fine grained sediments have been minimized.

IMPACTS UPON SOCIAL WELL BEING

105. The recommended plan was formulated in response to two major problems experienced by the Corea Harbor fishing fleet. The first problem is the overcrowding of boats in the anchorage. Overcrowding has resulted in frequent damage to boats, which are moored so close together that they collide during storms. The overcrowded situation has limited the potential for expansion of the fleet. The second problem is the existence of a rock formation and inconsistent depths and widths which obstruct navigation in the entrance channel. This has resulted in tidal delays and presents a safety threat to navigation during low water.

106. The recommended plan responds to the problems of overcrowding in the existing anchorage by providing for an additional three acres of anchorage area. Increasing the anchorage would permit more mooring space per vessel, preventing collisions and subsequent damages. Preventing vessel damage would indirectly increase productive fishing time by eliminating time needed to make repairs. The enlarged anchorage would allow an increased fleet size which ultimately would increase the lobster and scallop landings. The recommended plan complements local needs and desires by permitting the use of larger vessels as well as new vessels. More efficient utilization of the harbor encourages continued investment, enhancing the economic viability of Corea. Without the threat of collisions, families and individual boat owners wishing to purchase larger boats would now be willing to make the investment.

107. The recommended plan provides for a uniform depth and width for the entire length of the channel. This would allow for safe navigation of two-way vessel traffic during all tidal periods. Delays created by waiting for the passage of oncoming traffic would be eliminated. Offloading at the co-op dock would no longer pose the safety problems it currently does. The recommended plan would enhance the harbor's capability to handle finfish. Finfishing vessels generally are larger with greater draft than the lobster boats. Their use of the harbor or co-op facilities is restricted by the tides because of the inconsistent depths in the channel and lack of adequate mooring space. Both of these problems are eliminated by the recommended plan.

DISPOSAL IMPACTS

108. In addition to the impacts on water quality discussed above, the recommended plan entails several other environmental impacts commonly associated with ocean disposal. Creation of a spoil mound in the area to be used for sediment disposal will temporarily destroy the benthic environment. The area to be used for sediment disposal is the same site used for spoil from the 1953 maintenance dredging of Corea Harbor. Therefore the present bottom at the site and the material to be disposed of are very similar in terms of sediment type. This will minimize the time necessary for the site environment to recover and for benthic organisms to recolonize.

109. The disposal of rock removed from Corea's entrance channel will take place in an area of naturally rocky bottom so as to avoid creating a hazard to dragging operations. The disposal of rock in this manner would create an additional habitat for lobsters and other attached marine invertebrates.

IMPACTS ON REGIONAL DEVELOPMENT

110. The recommended plan will have a positive impact on the economic recovery of the Corea community and the surrounding area. Though only a modest increase in the volume of inshore fisheries is expected, the planned development of finfishing operations will lead to a decline in unemployment in the Gouldsboro area. The development of offshore finfishing industries in response to the 200 mile territorial limit is a prime concern in Hancock County and New England as a whole.

111. Associated industries such as fish processing, packaging, and transportation are expected to expand parallel to the development of the fleet's finfishing capabilities.

112. Since there is presently very limited use of Corea Harbor for recreational purposes such as boating, swimming or fishing, the temporary increase in turbidity will have no adverse impact on these activities.

IMPACTS ON HARBOR ENVIRONMENTS

113. Long-term impacts of dredging include removal of existing benthic organisms from the harbor bottom, removal or alteration of marine habitats in the intertidal zone, and permanent changes to the tidal currents in the harbor and channel.

114. The proposed plan will affect the intertidal zone of the harbor. The intertidal zone is the area of the harbor bottom between the low and highwater lines. This area is a valuable source of organisms at the lower end of the food chain and also a potential habitat for shellfish.

115. It is not expected that the long term impacts will significantly affect the environment. Recolonization of the dredging areas by benthic organisms and aquatic vegetation will occur over time. Removal and reseeding of the soft shelled clam population, as proposed by the Maine Department of Marine Resources would aid in the environmental recovery of the area.

116. The lobster population which principally inhabits the muddy bottom of the existing anchorage is not expected to be significantly impacted upon.

AIR QUALITY

117. Temporary air pollution impacts will occur during construction due to engine exhaust from the dredge and the tending boats. The primarily air pollution impacts relating to the disposal of the dredged material at sea will be emissions from tow boats.

SECTION E
IMPLEMENTATION RESPONSIBILITIES

COST ALLOCATION

118. Allocation of costs of the project are as follows:

Dredging the northeast anchorage	20%
Dredging the southern anchorage	20%
Dredging the entrance channel	60%

119. There are no other elements of the Federal project.

COST APPORTIONMENT

120. Since 100 percent of the benefits attributable to the improvement project are accruable by commercial interests, the Federal share of the costs of the project is 100 percent or approximately \$682,000.

FEDERAL RESPONSIBILITIES

121. The Federal Government will be responsible for 100 percent of the cost of improvements, which include dredging of the two anchorage areas and the entrance channel only. The Federal Government will be responsible for 100 percent of the costs of periodic maintenance dredging of all areas of the Federal project necessitated by natural shoaling, contingent upon the availability of maintenance funds.

122. The U.S. Coast Guard would provide and maintain all navigational aids.

LOCAL RESPONSIBILITIES

123. The local responsibilities are as follows:

- Provide, maintain and operate without cost to the United States, an adequate public landing with provisions for the sale of motor fuel, lubricants and potable water open and available to the use of all on equal terms.
- Provide without cost to the United States all necessary lands, easements and rights-of-way required for construction and subsequent maintenance of the project including suitable dredged material disposal areas with necessary retaining dikes, bulkheads and embankments therefor.
- Hold and save the United States free from damages that may result from construction and maintenance of the project.

- Accomplish without cost to the United States alterations and relocations as required in sewer, water supply, drainage and other utility facilities.
 - Assume full responsibility for all project costs in excess of the Federal cost limitation of \$2,000,000 under the 107 program.
 - Establish regulations prohibiting the discharge of untreated sewage, garbage, and other pollutants in the waters of the harbor, said regulations being in accordance with applicable laws and regulations of Federal, State and local authorities responsible for pollution prevention and control.
-

COREA HARBOR
GOULDSBORO, MAINE

DETAILED PROJECT REPORT

PUBLIC VIEWS AND RESPONSES
APPENDIX 3

Prepared By:

Department of the Army
Corps of Engineers
New England Division

APPENDIX 3
PUBLIC VIEWS AND RESPONSES
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PUBLIC VIEWS AND RESPONSES

SECTION A PUBLIC INVOLVEMENT PROGRAM

1. Views of Government agencies were obtained through initial contacts by telephone, written correspondence and meetings. Meetings were held with Federal, State, and local officials, private interests and concerned citizens to ascertain their views on the proposed improvement project and enlist their aid in determining community needs and trends, and developing baseline studies. The following is a summary of the major comments received during the coordination phase.

Federal Agencies

2. U.S. Department of the Interior, Fish and Wildlife Services.

Main concerns pertained to the proper removal of the current population of soft-shelled clams prior to the dredging activities, and the beneficial use of the dredged material in preference to ocean disposal.

3. U.S. Department of Commerce, National Marine Fisheries Service.

Expressed concern for the proper disposal of the dredged material, as well as careful observations of the biological values of the project area.

State Agencies

4. Department of Marine Resources.

Comments and confirmations of the Corea Harbor long-term fishing benefits were provided for the Corea Harbor navigational improvement project for the 1980-2030 period of analysis.

5. Maine Historical Preservation Commission.

Expressed concern for the possible effects of dredging at Bar Island on a significant prehistoric site situated on Young's Point.

Local Government Agencies

6. Town of Gouldsboro

Mention in regard to a 13 January 1976 town meeting was made; which justified the possible needs for a reconnaissance report for Corea Harbor, under the authority of Section 107 of the 1960 River and Harbor Act. Correspondence officialized the request for the reconnaissance study of Corea Harbor.

Private Industry

7. Corea Lobster Cooperative

Acknowledged acceptance of the Corps of Engineers Corea Harbor commercial navigational reconnaissance report. Appreciation was expressed for expediting a Washington approval.

In addition to correspondence, several meetings were held between the Corps of Engineers, concerned citizens, and various other Federal, State, and local agencies and offices. The following is a chronological listing of those meetings and attendees.

8. 13 January 1976 at Corea

Corps of Engineers, Gouldsboro Town Manager, Corea Harbormaster, Corea Lobster Coop President, concerned lobstermen and Corea residents.

9. 18 July 1978 at Corea

Corps of Engineers, Maine Department of Marine Resources, concerned lobstermen and Corea residents.

10. 20 July 1978 at Boothbay

Corps of Engineers and Maine Department of Marine Resources.

11. 13 March 1979 at Corea

Corps of Engineers, Maine Department of Marine Resources, local lobstermen.

12. 16 October 1979 at Boothbay

Corps of Engineers and Maine Department of Marine Resources.

Town of Gouldsboro

Box 69

Prospect Harbor, Maine 04669

January 19, 1976

Col. John Mason, Division Eng.
Dept. of the Army, Corps of Engineers
New England Division,
424 Trapelo Road, Waltham, Mass. 02154

Subject: Request for the Corps of Engineers to Undertake a Federal Navigation Study of Corea Harbor, in Gouldsboro, Maine.

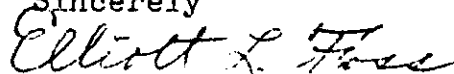
Dear Sir,

On January 13, a meeting in our town office between Raymond J. Boyd, P.E. the Corps of Engineers Project Study Manager, Earl Briggs, Harbor Master, Colby Young, Corea Coop President, Howard Urquart and Duane Urcuhart, Jean Symonds, Lobster fisherman and myself Elliott L. Foss, Town Manager was held. After a three hour discussion it was felt that justification is merited for a Federal Survey.

This letter is a request for the Corps of Engineers to undertake a Federal Navigation Study of Corea Harbor, under the Authority of Section 107 of the 1960 River and Harbor Act, as amended in 1967, 1971 and 1974.

We wish to thank the Corps of Engineers for consideration and the effort already shown us.

Sincerely



Elliott L. Foss
Town Manager of Gouldsboro

COREA LOBSTER COOPERATIVE, INC.

COREA, MAINE 04624

March 2, 1977

Steven Andon
US Army Corps of Engineers
New England Division
424 Trapello Road
Waltham, Mass. 02154

Dear Mr. Andon:

Regarding the Corps of Engineers reconnaissance report for commercial boat navigation in Corea Harbor, Gouldsboro, Maine, we want to acknowledge acceptance of your study and would appreciate your forwarding it to the Chief of Engineers, Washington, D. C. for approval.

Sincerely,

Earl Briggs

Earl Briggs,
President Corea Lobster Coop.

F. Dwight Rodgers

F. Dwight Rodgers III,
Manager, Corea Lobster Coop.

Arvin Young

Arvin Young,
Selectman



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Region
Federal Building, 14 Elm Street
Gloucester, Massachusetts 01930

April 12, 1977

Col. John P. Chandler, USA
Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

We have reviewed the reconnaissance report dated January 24, 1977, describing navigational improvements in Corea Harbor in Gouldsboro, Maine.

The information provided in the reconnaissance report is not sufficient to adequately assess the potential for environmental impacts.

Information as to deposition of the 50,000 cubic yards of dredge spoil material should be included in future reports. We understand there are no nearby approved ocean disposal grounds. If offshore disposal is recommended, it is likely that problems will be encountered because of the highly productive fishing grounds in the general area. Therefore, it may be advantageous to investigate alternatives to ocean disposal.

Further, sediments in the dredge area should be analyzed to determine types of pollutants, if any, that may exist, and biological values of the project area should be determined, including migratory periods and species that utilize the project area.

We appreciate this opportunity to review and comment on the proposed project.

Sincerely,

for *Arthur Rehfus*
William G. Gordon
Regional Director





UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. Box 1518
Concord, New Hampshire 03301

JUL 03 1979

Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This planning aid letter is intended to assist you in the study of navigation improvements at Corea Harbor in the township of Gouldsboro, Hancock County, Maine. It supersedes our letter of March 21, 1977. Your study is authorized by Section 107 of the Rivers and Harbors Act of July 14, 1960, as amended. This letter is submitted under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Corea Harbor consists of an anchorage 400 feet wide by 600 feet long (about 5 acres), dredged in 1937-1938 to a depth of 8 feet. Maintenance dredging was accomplished in 1953. The entrance channel has not been dredged.

Preliminary harbor modifications proposed by local interests include expansion of the existing anchorage by 3 acres and dredging the entrance channel to achieve a depth of 7 feet and a width of 60 feet. It is estimated that about 45,000 cubic yards of sediment and 5,000 cubic yards of ledge may be removed.

The harbor is polluted to the extent that soft-shell clams cannot be harvested.¹ These clams are found primarily in the intertidal zone and dredging will cause the loss of their habitat. Even though the clams cannot be harvested they are valuable for providing an annual seed source for other clam flats. The clams could become suitable for human consumption if the pollution is abated in the future. We will need to be advised of the extent of the intertidal zone to be dredged, including allowances for the side slope of the channels, in order to determine the extent of their loss. There is limited commercial use of other benthic organisms such as clam worms, blue mussels and snails. Commercial use of the worm and mussel populations is small. We know of no endangered or threatened species in the project area.

¹Personal communication, Maine Department of Marine Fisheries.

A fairly extensive fringe Spartina marsh has developed at the upper tidal levels of the remaining spoil from the 1953 dredging. This area should not be used for spoil from this project. Your plans for the project should include notification of the Maine Department of Marine Resources at least 30 days in advance of the start of dredging so that the existing population of clams can be tested for bacteria and removed by the Maine Department of Marine Resources for processing through a depuration plant if contamination is within acceptable levels. This action could reduce losses by salvaging existing clams but it would not affect future loss of production during the project life.

The spoil material should be put to some beneficial use or contained at an acceptable site. If feasible, the rock materials should be used to construct a reef at a location selected in coordination with this Service, the Maine Department of Marine Resources, the National Marine Fisheries Service, and the local residents. A small artificial reef would attract small fish and benthic organisms which, in turn, would attract larger fish and lobsters. The possibility of using the remaining spoil, if it is suitable, to create a tidal flat or improve a beach such as Sand Cove (located in the vicinity of the Harbor) should be considered. We are prepared to assist you in locating possible sites if such use appears feasible. We request a copy of the bio-analysis report if disposal at sea is necessary.

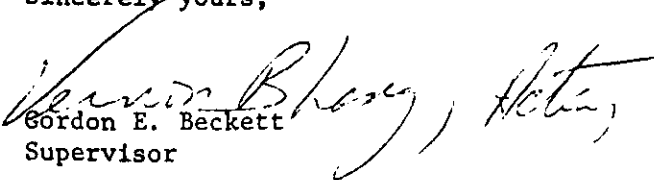
Future requirements for maintenance dredging should be estimated and disposal sites selected for future maintenance spoil before the project is approved. This will insure that adequate provisions for disposal of maintenance spoil are included as a part of the project.

We recommend that:

1. The Maine Department of Marine Resources be advised 30 days before the start of dredging so that the current population of soft-shell clams can be removed.
2. Beneficial use of the spoil or upland disposal be considered in preference to ocean disposal.
3. Provisions be made for disposal of spoil from future maintenance dredging.

We will prepare a fish and wildlife report concerning the selected plan when the detailed report is received.

Sincerely yours,


Gordon E. Beckett
Supervisor



STATE OF MAINE
DEPARTMENT OF MARINE RESOURCES
STATE HOUSE
AUGUSTA, MAINE 04333

October 29, 1979

Division Engineer
U. S. Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

Re. Corea Harbor, Maine, Project

Dear Sir:

As a result of meetings with Steve Andon of your office and Frank Woodard of Dale Caruthers Co., this Department has reviewed the findings regarding project benefits for Corea Harbor and makes the following conclusions:

(1) DMR has no evidence that would indicate that a 10% increase in the lobster catch in the Corea area would have an adverse affect on the resource. In view of an increase in total lobster landings in Maine there is reason to believe that a 10% catch increase at Corea, as a result of increased fishing effort made possible by the project, is a reasonable estimate.

(2) While marine scientists differ on the likely affect of harvesting on scallop populations, DMR believes that current levels of fishing in Gouldsboro Bay are moderate (only 3 or 4 vessels during a short season), and it may well be conservative to estimate that 25 additional days of fishing would nearly double scallop landings at Corea.

(3) Since there has been little or no finfish harvesting by Corea fishermen in the past, projections as to the probable benefits to be realized must be based on reasonable assumptions and estimates developed on experience in other areas. Some of these are:

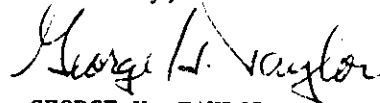
- (A) With a larger anchorage, there will be room to moor additional vessels and larger vessels.
- (B) Because of increasing market opportunities for finfish, it is reasonable to believe (as Corea fishermen have reported) that from two to five new boats in the 55 foot class would be added to the fleet to enter the finfish fishery.

- (C) The fact that Young's Boatyard has a design for a boat of this size and type further strengthens such an assumption.
- (D) While such vessels may be equipped as draggers, it is more likely that they will be used as gill-netters or long-liners.
- (E) There is reason to believe that within the next few years a regional fish processing center may be established - perhaps in the Ellsworth area. This would provide a strong incentive for the increased harvesting of finfish. Until such a processing plant is established, it is assumed that Corea fish would be trucked to more distant markets.
- (F) To compute a benefit for finfish, many variables must be considered. For example, there may be five or more different species that would be landed - all in different volumes. Average prices paid to fishermen state-wide in 1978 for five likely species were: cod, \$. 22; gray sole, \$.59; haddock, \$.35; white hake, \$.14; pollock, \$.16. From these ranges, an arbitrary assumption can be made that fishermen would on an average get about 20 cents a pound for their total catch. Then assuming that each boat would catch 25,000 lbs. of fish a month - or 300,000 lbs. a year - it is possible to estimate that two new boats would produce a catch worth approximately \$120,000 gross, and five new boats would produce a catch worth about \$300,000. Other more optimistic scenarios are, of course, possible, but the above is conservative and defensible.

(4) DMR has no problem with the \$9,600 annual savings predicted as a result of reducing damage to boats in the anchorage caused by overcrowding. A further benefit should also be considered here - the elimination of lost fishing time because damaged vessels are laid up for repairs.

It is hoped that the above comments will prove helpful in calculating the project benefits for the Corea Harbor improvement project. There is no doubt that Corea fishermen urgently need the proposed improvement, and DMR is happy to provide whatever assistance it can towards the accomplishment of the project.

Sincerely,



GEORGE H. TAYLOR
Director of Public Relations
and Marketing

GHT/abr



MAINE HISTORIC PRESERVATION COMMISSION
242 State Street
Augusta, Maine 04333

Earle G. Shettleworth, Jr.
Director

Telephone
207-289-2111

October 31, 1979

Mr. Joseph L. Ignazio
Chief, Planning Division
Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

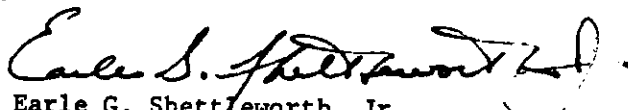
re: NEDPL-I Corea Harbor

Dear Mr. Ignazio:

There is one significant archaeological site near your proposed dredging activities between Bar Island and the Mainland. Specifically, a prehistoric site (#45-8) lies on the tip of Young's Point approximately 400 meters NNE of the center of Bar Island.

If you can assure us that your dredging activities will have no effect upon the Mainland above mean high tide, then we can clear the project.

Sincerely,



Earle G. Shettleworth, Jr.
State Historic Preservation Officer

EGS/slm

15 December 1980

ANNOUNCEMENT OF PUBLIC MEETING
COREA HARBOR, GOULDSBORO, MAINE

The New England Division, Corps of Engineers, is nearing completion of a study to determine the engineering feasibility, economic justification, and environmental acceptability for providing navigation improvements in Corea Harbor, Gouldsboro, Maine, in the interests of commercial navigation. The study is being conducted under the authority of Section 107 of the 1960 River and Harbor Act, as amended.

The study was originally initiated at the request of officials of the town of Gouldsboro dated 19 January 1976.

In order to allow for public review of, and input to, the project, there will be a public meeting held at the Gouldsboro Grammar School, 20 January 1981, at 7:00 p.m.

This meeting is being held in order that the public may be advised of the study findings. All interested parties are invited to be present or represented at the meeting, including representatives of Federal, state, county, and local agencies; commercial, civic, and conservation groups; and property owners, private citizens, and other interests.

The study included the following work: analyses of the present and prospective commercial use of Corea Harbor; detailed cost-benefit analyses; an investigation of all alternative navigation improvements; and detailed analyses of the impact of the proposed improvement including an environmental assessment. Plan formulation has been coordinated with all known affected and interested Federal, state, and local government agencies; private groups, and individuals.

A plan of improvement, shown on Figure 1, has been developed that would provide the following:

- a 100-foot wide access channel with a depth of 8 feet MLW for a length of 2,000 feet to the southeast corner of the existing 8-foot Federal anchorage basin.

- a 1.5 acre anchorage with a depth of 6 feet MLW located north-east of the existing 8-foot Federal anchorage basin.

15 December 1980

- a 1.5 acre anchorage with a depth of 6 feet MLW located southwest of the existing 8-foot Federal anchorage basin.

The total cost of this improvement is presently estimated at \$682,000. Since the benefits resulting from this improvement are entirely commercial in nature, the total construction costs will be borne by the Federal Government.

Local interests will be responsible for provision of necessary lands, easements, and rights-of-way; and holding the United States free from damages that may result from construction and subsequent maintenance of the project. Future project maintenance will be a responsibility of the Federal Government.

A detailed explanation of the plan of improvement, the attendant costs and benefits; the environmental impacts and all items of local cooperation will be presented at the public meeting. The intent of the meeting is to have a free and open exchange of views regarding the study findings.

Comments will be welcome from those who have new information not previously presented which may support justification for additional improvements. Likewise, those opposed to the improvements are invited to express any new information relating to their opposition. All views, pro and con, will be included in the official written record of this study and will be available for public examination. Please be sure any information presented is new and not a repetition of data already presented and included in the study.

Any specific information and additional data on man's environment or the natural ecology that may be related to navigational improvements can be presented at this meeting.

Copies of the draft Detailed Project Report and Environmental Assessment are expected to be available to the public for review during the week of 5 January 1981 in the Gouldsboro Town Office Building.

If you have any questions or comments regarding this project, please contact the project manager, Steven Andon, at:

Department of the Army
Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254
Tel. (617) 894-2400, ext. 550

15 December 1980

All comments on any aspect associated with navigation improvements will receive full consideration before recommendations are made to the Office of the Chief of Engineers. Oral statements will be heard but, for accuracy of record, all important facts and statements should be submitted in writing, in duplicate, to the presiding officer at the meeting or may be mailed beforehand to the above address. Statements so mailed should indicate they are in response to this announcement.

Please bring this announcement to the attention of anyone you know to be interested in this study.

Incl
Figure 1

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDPL-C

9 January 1981

TO: CONCERNED COREA HARBOR INTERESTS

This letter attaches a Draft Detailed Project Report concerning the feasibility of providing navigation improvements in Corea Harbor in the interests of commercial navigation and related purposes. This document is forwarded to you for public review and comment to obtain your views on the concept of constructing an anchorage and access channel to service the commercial fishing facilities both existing and proposed.

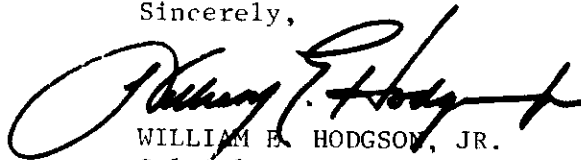
Several alternatives were analyzed in an attempt to find the improvement plan which best meets the present and expected needs of the commercial fishing fleet. The results of this analysis indicate that the most feasible plan of improvement at this time consists of an access channel 8 feet deep and 100 feet wide, extending from deep water for a distance of approximately 2,000 feet to the existing Federal anchorage basin, and three additional acres of mooring area at a depth of 6 feet MLW.

The report consists of a description and impact assessment for each alternative plan as well as a discussion of the rationale for selecting the final plan.

The attached report will be open for public comment for a 30-day period ending 9 February 1981. Please direct all comments, before this date, to the Acting Division Engineer at the following address:

Acting Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254

Sincerely,


WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer

Incl
As stated

January 20, 1981

Department of Army Engineers
424 Trapelo Road
Waltham, Ma

Dear Sirs:

As a fisherman from a neighboring harbor, I see a great need for the enlarging of Corea harbor, which has been long overdue. Along with other harbors, Corea is in great need for a larger harbor due to the fact younger fishermen and larger boats the harbor is beginning to get more over crowded. Due to storms on the southerly board it causes a great amount of undertow and rough seas causing damage to boats by being over crowded. Storms have caused boats to leave their moorings and go ashore and cause damages. Hopefully with the dredging this situation could be cut down a great deal.

The fishermen of this harbor turn over a great deal of money back into the economy by having new boats and a great deal of gear and equipment for lobsterfishing and dragging. These fishermen are not asking the government for any hand-outs, but only to support them in helping make a better harbor and a change for their boats in which we are speaking in the neighborhood of 40 boats, being roughly at \$1,500,000.00 plus equipment belonging to each and everyone.

Also these fishermen share this harbor in the winter months with fishermen who have to leave their own little harbors due to ice problems and bad weather. In 20 odd years of knowing these fishermen I have never known them not to share this harbor to others when in need to do so.

The records should already be in order to do the dredging for these fishermen who put in long hard hours at sea. These people deserve the right in having a finer harbor, being as dedicated to their work as they are.

Gentlemen, as one of the Selectmen and a fishermen of this town, I hope to have expressed in a small way the need of improving Corea harbor.

Sincerely Yours

Harvey A. Crowley
Harvey Crowley



HANCOCK COUNTY PLANNING COMMISSION

69 Main Street, Ellsworth, Me. 04605

(207)-667-7131

JAMES S. HASKELL, Jr.

EXECUTIVE DIRECTOR

January 21, 1981

Amherst
Aurora
Bar Harbor
Blue Hill
Brooklin
Brooksville
Bucksport
Castine
Cranberry Isles
Dedham
Deer Isle
Eastbrook
Ellsworth
Franklin
Frenchboro
Gouldsboro
Great Pond
Hancock
Isle au Haut
Lamoine
Lucerne-in-Maine
Mariaville
Mount Desert
Orland
Osborn
Otis
Penobscot
Sedgwick
Sorrento
Southwest Harbor
Stonington
Sullivan
Surry
Swan's Island
Tremont
Trenton
Verona
Waltham
Winter Harbor

Col. William Hodgson, Jr.
Dep't. of Army
Corps of Engineers
424 Trapelo Street
Waltham, MA 02245

Dear Col. Hodgson:

I am writing on behalf of the Planning and Program Review Committee of the Hancock County Planning Commission. The Committee acts as an areawide clearinghouse responsible under state and federal statutes to review federal grant/loan applications affecting the Commission's region.

The Committee approves your proposed navigational improvements for Corea Harbor in Gouldsboro. This action completes the clearinghouse review process of the Hancock County Planning Commission.

As a matter of record, the Committee would appreciate receiving notification of the action taken on this proposal.

Sincerely,

Kathleen Billings

Kathleen C. Billings
Committee Assistant to the
Planning and Program Review Committee

cc: Josephine Gacetta, State Clearinghouse
Jonathan Thomas, Gouldsboro Town Manager



**STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA, MAINE
04888**

JOSEPH E. BRENNAN
GOVERNOR

January 26, 1981

Colonel William E. Hodgson, Jr.
Department of the Army
Corps of Engineers
Waltham, MA 02254

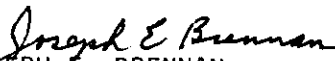
Dear Col. Hodgson:

Thank you for your letter and draft report concerning the feasibility of providing navigation improvements in Corea Harbor in the interest of commercial navigation and related purposes.

I appreciate receiving this information and am taking the liberty of forwarding a copy of your letter and enclosures to Henry Warren, Commissioner of the the Maine Department of Environmental Protection.

Thank you again for writing on this matter.

Sincerely,


JOSEPH E. BRENNAN
Governor

JEB:mas

cc: Henry Warren, Commissioner
Dept. of Environmental Protection

27 January 1981

Mr. Jonathan Thomas
Town Manager
Couldsboro, ME 04669

Dear Mr. Thomas:

I am responding to your recent request for an example letter of concurrence and the information you desired pertaining to the necessity of holding a town meeting prior to the signing of formal assurances with us regarding Corea Harbor.

Having discussed the situation with my staff, it was agreed that the following process would be acceptable. We will require a letter signed by the town selectman prior to forwarding the report to Washington for final review and approval. A typical format has been inclosed for your use. Prior to our initiating the detailed plans and specifications during late spring 1981, an additional letter indicating the project report was approved at the town meeting will also be required.

It is hoped that the two-stage approval process, as outlined above, will facilitate report approval and allow us sufficient time to plan for a possible construction start during fall 1981.

Should you have any questions, please feel free to contact me at (617) 894-2400, extension 222. Mr. Andon of my staff is coordinating the investigation. Should your staff desire any additional information, he can be reached at extension 550.

Sincerely,

Incl
As stated

WILLIAM E. HODGSON, JR.
Colonel, Corps of Engineers
Acting Division Engineer

DRAFT PROPOSED LETTER OF CONCURRENCE

Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254

Dear Sir:

The town of Gouldsboro supports the proposed dredging project for Corea Harbor as outlined in the Draft Detailed Project Report dated January 1981.

We also agree to comply with the local assurances as stipulated in the report and will be prepared to sign the formal assurances after the town meeting scheduled for March 1981.

Sincerely,

TOWN COUNCIL

Town of Gouldsboro

Box 69

Prospect Harbor, Maine 04669

February 3, 1981

William E. Hodgson, Jr.
Colonel, Corps of Engineers
Acting Division Engineer
New England Division, Corps of Engineers
424 Trapelo Rd.
Waltham, MA 02254

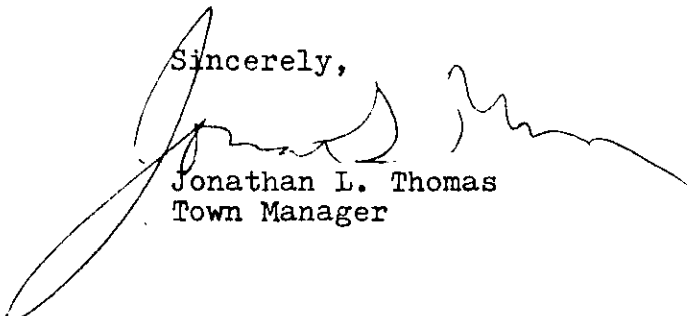
Dear Col. Hodgson:

Thank you for your recent letter giving further information on the steps needed to comply with application requirements for the Corea dredging.

I have been asked to request that your staff send further information on what is expected under terms 1 and 2 of the list of Non-Federal Responsibilities, as given on page 19 of the report. We would appreciate receiving this information within the next few days, if possible. Also, would you please have Mr. Andon call Selectman Harvey Crowley at 963-5836, or Harbor Master Earl Briggs, Jr. at 963-2309, so that any questions on this can be clarified further.

Thanks.

Sincerely,



Jonathan L. Thomas
Town Manager

cc: Harvey Crowley
Earl Briggs

JLT/gmb



JOSEPH E. BRENNAN
GOVERNOR

ALLEN G. PEASE
STATE PLANNING DIRECTOR

State of Maine
Executive Department
State Planning Office
State House Station 38

184 State Street, Augusta, Maine, 04333

TEL (207) 289-3261
RESOURCES PLANNING 289-3155

February 3, 1981

William E. Hodgson, Jr.
Colonel, Corps of Engineers
Acting Division Engineer
Department of the Army - N.E. Division
424 Trapelo Road
Waltham, MA 02254

re: Corea Harbor Navigation Improvement Program.

Dear Colonel Hodgson:

In response to your letter of January 26, 1981 in which you make a consistency certification, you will receive consistency concurrence with Maine's Coastal Program when you receive your appropriate State Permits from the Department of Environmental Protection. The way consistency works in Maine, projects are consistent when they are approved under our eleven "Core Laws" - no ~~separate~~ review is required. I am enclosing a booklet describing our Federal Consistency Process which should explain our process and answer any questions you might have. Should you have any other questions - please call me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Robert P. Elder".

Robert Elder
Planner

RE/i

Enclosure



**DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD**

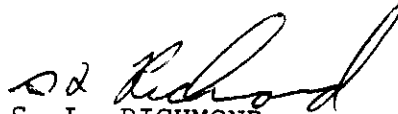
MAILING ADDRESS:
COMMANDER (CZM)
FIRST COAST GUARD DISTRICT
150 CAUSEWAY STREET
BOSTON, MA 02114
Tel: (617) 223-6251
16475
4 February 1981

•From: Commander, First Coast Guard District
To: Acting Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254

Subj: Corea Harbor, ME; Detailed Project Report and
Environmental Assessment for

1. I have reviewed the Detailed Project Report and Environmental Assessment for Corea Harbor, ME. dated January 1981. I have no substantive comments at this time regarding this document or the recommended plan.

2. Upon request, the U.S. Coast Guard will publish a Notice to Mariners regarding dredging and blasting operations.


S. L. RICHMOND
By direction

12 February 1981

Mr. Jonathan L. Thomas
Town Manager
Town of Gouldsboro
Box 69
Prospect Harbor, ME 04669

Dear Mr. Thomas:

I am responding to your letter of 3 February 1981, requesting clarification concerning the items of local cooperation, in particular, items 1 and 2 as discussed on page 19 of the Draft Detailed Project Report for Corea Harbor.

The following clarification is provided in reference to item 1, which states that local interests must "Provide, maintain and operate without cost to the United States, an adequate public landing with provisions for the sale of motor fuel, lubricants and potable water open and available to the use of all on equal terms."

During the course of the navigation improvement study for Corea Harbor, the manager of the lobster coop indicated that he is presently allowing transient craft to utilize the coop facility for basic provisions and would continue to do so in the future. In our opinion, assured continuance of this practice would be full compliance with assurance number 1.

The following clarification is provided in reference to item 2, which states that local interests will "Provide without cost to the United States all necessary lands, easements, and rights-of-way required for construction and subsequent maintenance of the project including suitable dredged material disposal areas with necessary retaining dikes, bulkheads and embankments therefor."

Construction of the recommended plan of improvement would be accomplished by barge. Therefore, in this instance, lands, easements, and rights-of-way (other than assuring no moorings are in the path of the dredge) will not be necessary. In addition, the recommended disposal site is located offshore of Corea Harbor; therefore, retaining dikes, bulkheads, or embankments will not be required.

NEDFL-C

Mr. Jonathan L. Thomas

12 February 1981

Should you have any questions, please feel free to contact me at (617) 894-2400, extension 220. Mr. Andon of my staff coordinated the investigation. Should your staff desire additional information, he can be reached at extension 550.

Sincerely,

C.E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. Box 1518
Concord, New Hampshire 03301

FEB 13 1981

Colonel William E. Hodgson
Deputy Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Hodgson:

This is our fish and wildlife report concerning your study of a small navigation project at Corea Harbor, Gouldsboro, Maine, as presented in your Draft Detailed Report dated January 1981.

This report is submitted under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and it supplements our planning aid letter to your office dated July 3, 1979, which provided our views and recommendations concerning the project. We appreciate that you plan to advise the Maine Department of Marine Resources 30 days before dredging starts, so that they can remove softshell clams from the dredge site as we recommended.

We fail to find that you have selected a site to dispose of dredged spoil (Recommendation 3 of our letter) which will be removed about every 25 years. This is a long time period and many changes can take place. Therefore, a disposal site should be approved as part of the maintenance program. If necessary, it could be changed during pre-maintenance studies.

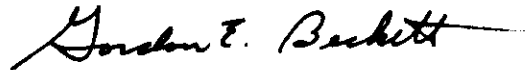
The Finding of No Significant Impact on page 52 of your report concludes that "...the proposed plan (Plan A) is the most practical and environmentally acceptable option". Didn't you mean Plan C?

The system of accounts (Table 2-6) states that wildlife would be destroyed by rock and sediment disposal at Sites A and B. We feel that this should be explained in the text because it is not clear what wildlife would be lost. The loss of benthic fauna is adequately covered in the table as is the temporary and permanent disruption of fish habitat.

On page 2-19 it is stated that you intend to place rock spoil on existing rocky bottom. Site "1s" has been selected (page 33) but the bottom substrate is not described in the text. The sampling stations described on page 35 and 36 and Figure 15 mention a hard, flat, bottom covered with gravel, small rocks, and shell but they are not located in area "1s". We concur in your plan to create habitat for lobsters with the rock spoil. Bottom conditions at Site "1s" need to be described so that a comparison with the rock spoil can be made.

We agree with your selection of Plan B as the E.Q. plan. We have no objection to your selection of Plan C provided that the work is done between November and April, and that disposal is accomplished to provide maximum benefits and least damages as planned.

Sincerely yours,

A handwritten signature in cursive script that reads "Gordon E. Beckett". The signature is written in dark ink and is positioned above the typed name and title.

Gordon E. Beckett
Supervisor

Town of Gouldsboro

Box 69

Prospect Harbor, Maine 04669

February 17, 1981

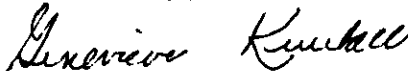
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254

Dear Sir:

The Selectmen of Gouldsboro support the proposed dredging project for Corea Harbor as outlined in the Draft Detailed Project Report dated January 1981.

We also agree to comply with the local assurances as stipulated in the report and will be prepared to sign the formal assurances after the town meeting scheduled for March 1981.

Sincerely,



Genevieve Kimball
Acting Chairman



Harvey Crowley
Selectmen of Gouldsboro



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02101

February 24, 1981

Colonel C.E. Edgar, III
Division Engineer
U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254

Re: NEDPL-C
Corea Harbor, Gouldsboro, ME

Dear Colonel Edgar:

We have reviewed the Draft Detailed Project Report concerning the feasibility of providing navigation improvements in Corea Harbor. The proposed plan consists of an access channel 8 feet deep and 100 feet wide, extending from deep water for a distance of approximately 2,000 feet to the existing Federal anchorage basin, and three additional acres of mooring area at a depth of 6 feet MLW.

We concur with the Section 404 Evaluation and the finding of no significant impact for this project.

This is based upon our understanding that this improvement project is intended to be authorized separately from the maintenance dredging of Corea Harbor (Corps decision due to the difference in dredge spoil types). This is why this report did not select a sight for disposal of dredged material from maintenance dredging. Further, the disposal for dredge spoils from this improvement project is intended to be as follows:

Rock spoil (2,670 cubic yards) will be placed at disposal site A, located near the Whistle Buoy, southwest of Western Island, a site with an existing rocky substrate. This will create additional habitat for lobsters, as well as attached marine invertebrates; and

unconsolidated sediments (the sand, silt and gravel) portion of the dredged material (31,000 cubic yards) will be placed at an open water site located one nautical mile south of Outer Bar Island, which contains similar sized sediments. This site was used for spoil from the 1953 maintenance dredging of Corea Harbor.

Finally, we understand that prior to project commencement, the Corps will notify the Maine Department of Marine Resources, who will remove and suitably transplant lobsters and softshell clams from the dredging site, if they are found in reasonable abundance.

Please contact Edward Reiner, of my staff, at 617-223-5061 if you have any questions or comments regarding our review of this project.

Sincerely,

A handwritten signature in cursive script, reading "Allen J. Ikalainen".

Allen J. Ikalainen
Chief, Special Permits Development Section

cc: USF&WS, Concord, NH
NMFS, Gloucester, MA



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Services Division
Habitat Protection Branch
7 Pleasant Street
Gloucester, MA 01930

MAR 2 1981

Col. William E. Hodgson, Jr.
Acting Division Engineer
Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Dear Colonel Hodgson:

The National Marine Fisheries Service (NMFS) has reviewed Public Notice NEDPL-C, dated December 15, 1980, and a Draft Detailed Project Report and Environmental Assessment (herein referred to as the Project Report) concerning the feasibility of providing navigational improvements in Corea Harbor, Maine. The proposed activity would directly benefit an existing lobster fishery, and possibly allow expansion and fishery diversification.

Several alternative plans were proposed to improve harbor access and create more secure anchorage areas. The Army Corps of Engineers' (COE) recommendation, Plan C, is a combination of Plan A and B. Plan A proposes the creation of a 1.5 acre mooring area 6 feet deep, northeast of the existing federal mooring area. Plan B would create an 8 foot deep by 100 foot wide by 2,000 foot long access channel extending from the existing mooring area to deep water outside the harbor. Plan B also proposes a 1.5 acres mooring area, 6 feet deep, south of the existing mooring area.

The plan recommended by the COE requires the dredging of approximately 30,900 cubic yards of sand and gravel and the removal of approximately 2,670 cubic yards of rock ledge. These materials would be disposed of at two separate offshore disposal sites, one designated for rock and the other for sand and gravel.

Plan C would establish an additional 3 acres of mooring space by dredging 1.5 acres south and 1.5 acres northeast of the existing federal mooring area. The 1.5 acres northeast is presently a productive inter-tidal clam flat. Though the area is polluted and the clams cannot be harvested, they are a source of larvae for other clean clam habitat areas. Dredging the northeast site would destroy the value of the area as clam habitat.



The Project Report states that the lobster fishery in the Corea Harbor area can support only four additional boats, and expansion beyond four new boats probably would not increase overall catch. Expansion of the lobster fleet, and alleviation of crowded conditions requires only 1.5 acres of additional mooring space, which would be provided by the area south of the existing mooring area.

The 1.5 acres to the northeast would make room for finfish boats, allowing them to use Corea Harbor as a base of operations. We question the need for finfishing access from Corea Harbor. Most finfish resources are currently utilized to their maximum via quotas, and establishment of a new base of operations could possibly redistribute landings away from established ports elsewhere in Maine and New England.

Plan B would create enough mooring space for maximum lobster fishery development, create a safe harbor access and involve less dredging than Plan C. The NMFS realizes there is interest in fisheries diversification in the Corea Harbor area, but in light of the concerns stated above, we request the COE to consider whether dredging northeast of the existing federal mooring area is necessary. We will not object to the implementation of Plan C, but believe that Plan B is the preferable course of action.

NMFS has no objection to open ocean disposal methods for the dredged and rock ledge materials to be removed from Corea Harbor. The materials appear similar both physically and chemically to the natural substrates at the two proposed disposal sites. Placement of the rock ledge materials may be beneficial to the lobster industry, by providing additional lobster habitat. However, we are concerned about possible effects upon endangered species and marine mammals which are known to frequent the area. Several endangered whales may be found in the area during the summer. Dr. Steven Katona at the College of the Atlantic in Bar Harbor, Maine, has compiled several years of whale sighting information in the area, and should be contacted for temporal and spatial distribution of whales in the Corea Harbor area. The COE should address the potential impacts of this project on those species in order to comply with Section 7 of the Endangered Species Act of 1973, as amended.

Sincerely,



Ruth Rehfus
Acting Branch Chief

COREA HARBOR
GOULDSBORO, MAINE

DETAILED PROJECT REPORT
ENGINEERING INVESTIGATIONS,
DESIGN AND COST ESTIMATES

APPENDIX 4

Prepared by:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

APPENDIX 4

ENGINEERING INVESTIGATIONS, DESIGN AND COST ESTIMATES

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INTRODUCTION

1. A variety of engineering investigations was conducted in the areas of the project selected for detailed study. There are four separate areas under consideration for improvements which require dredging. These are the areas to the northeast of the existing Federal anchorage basin (Plans A and C), the area to the south of the basin (Plans B and C), the access channel to the harbor (Plans B and C), and the area considered as a site for a thoroughfare channel between Bar Island and the mainland (Plan D). The construction of a protective breakwater to the west of the access channel has also been considered as a separate plan of improvement (Plan E).

HYDROGRAPHIC SURVEYS

2. A hydrographic condition survey of the project area was performed in the summer of 1977. This survey did not include the Bar Island thoroughfare area. The survey results, as shown in Figure 4-1, show the plotted depths within the harbor basin and channel areas and provide an accurate assessment of harbor and channel bottom contours.

SUBSURFACE INVESTIGATIONS

Test Borings

3. Three test borings were made, one in each of the three regions of the project, in order to determine the type of material that would be encountered at depth. This information is summarized in Figures 4-2, 4-3, and 4-4. The locations of these borings are shown in Figure 4-5.

Machine Probing

4. Thirty-six machine probings were performed in the project area. The purpose of these probes was to establish the depth of the existing bottom and the depth of any ledge which would have to be removed. The results of these probings are summarized in Figures 4-6 and 4-7, and their locations are shown on Figure 4-5.

CHANNEL CROSS SECTIONS

5. The data derived from the hydrographic surveys and subsurface investigations was used to develop several representative cross-sections of the various project areas. These cross-sections were used to develop quantity estimates for both sediment and ledge rock for the various sections of the project area. A few typical cross-sections are shown in Figures 4-8 and 4-9. The location of the sections are shown on Figure 4-10.

GEOLOGIC ANALYSIS OF PLANS

Areas Available for Dredging

6. Northeastly Side of Anchorage. The northeasterly side of the anchorage could be dredged with a clamshell or backhoe to a depth of 8.0 feet below mean low water without encountering rock. One and a half additional acres could easily be added to the mooring area in this vicinity.

7. Southerly Side of Anchorage. The area south of the existing anchorage could be dredged with a clamshell or backhoe to a depth of 6.0 feet below mean low water without encountering rock. One and a half acres could easily be added to the mooring area in this vicinity.

8. Harbor Channel. The machine probings and borings showed that large amounts of rock as well as a small amount of sand and gravel would have to be removed from the channel in order that the channel be at least 8.0 feet deep at mean low water over its entire length and 100-foot width.

Quantities of Material to be Removed

9. Estimates of materials to be removed are based on hydrographic surveys of the existing bottom of the harbor (Figure 4-1), test boring and machine probings (Figures 4-2 thru 4-6), and in the case of the Bar Island thoroughfare area, hydrographic and seismic surveys, Figures 4-13 and 4-14, respectively.

10. The dredged quantities were determined by using the above mentioned investigations to develop several cross-sections of each area of the project. The average cross-section area and width were multiplied to determine the volume of each section. In these computations a one-foot overdredge was assumed in areas where a mud and gravel bottom exists and a two-foot overdepth in areas of ledge bottom.

11. Southerly Side of Anchorage. The area available for dredging on the southern side of the existing 8-foot anchorage basin is 1.5 acres in area. The average dredging depth was calculated to be 3.5 feet. The quantity of material to be removed from this section of the project is dependent upon the final width of the proposed entrance channel. This is especially critical in determining the amount of ledge to be removed from the anchorage. The recommended plan channel dimensions of 8 feet deep by 100 feet wide were used to determine the volume for the southern anchorage extension area. The quantity of material to be removed is 12,650 cubic yards of which 140 cubic yards is ledge and 12,510 is mud, sand and gravel.

12. Entrance Channel. An attempt was made to align the channel so as to preclude having to remove ledge. This was found not to be possible because of the extent of ledge in the channel area. In order to provide a 100-foot wide channel, 8 feet deep at mean low water, some rock must be removed. The quantity of rock to be removed from the channel was calculated

from the rock contours developed from boring and probing data (see Figure 4-11). The quantity of rock to be removed from the channel area is approximately 2,530 cubic yards. In addition to this approximately 4,010 cubic yards of sand, gravel and mud must also be removed.

Bar Island Thoroughfare

13. The location where a channel would be dredged through the sandbar area between Bar Island and the mainland is shown in Figure 4-12. A hydrographic survey of the thoroughfare area was conducted in the summer of 1980 and is shown in Figure 4-13.

14. The length of channel to be dredged through the bar was estimated to be 1,200 feet. The average depth to be dredged was 8 feet in order to provide a channel 6 feet deep at mean low water. The side slopes of the channel would have to be 1:3 in areas of sand bottom, in order to provide reasonable stability. The total quantity of material to be removed by dredging, based on the seismic survey and other data was calculated to be 1,450 cubic yards of rock and 8,950 cubic yards of sand and gravel.

Table 4-1
Breakdown of Quantities of Dredged Material

<u>Project Area</u>	<u>Quantity of Ordinary Material</u>	<u>Quantity of Ledge</u>	<u>Total</u>
Channel (for 100 x 8 foot)	4,010	2,530	6,540
Northeast Anchorage Expansion	14,350	-	14,350
Southern Anchorage Expansion	12,510	140	12,650
Bar Island Thoroughfare Area	3,950	1,450	10,400

Breakwater Construction

15. The construction of a breakwater at the mouth of Corea Harbor would have the purpose of protecting vessels moored in the anchorage areas from large waves generated by southerly winds during periods of high tide. The breakwater would be relatively small and would be constructed entirely on ledge.

16. Construction of the breakwater could be done most inexpensively using land based equipment where the breakwater would be connected to land at its southwestern end. This would require construction of a temporary road, approximately 150 yards long, on private property. Extreme care would have to be exercised to avoid permanent damage to the area and to restore it to its original state at the conclusion of construction.

17. The benefits associated with construction of the breakwater would be derived from a reduction in lost fishing time due to repairs necessitated by damage to vessels from southerly wind and large waves.

DREDGING AND COST ESTIMATES

18. The values presented are based on the use of a three cubic yard bucket dredge, a drill boat and dynamite barge, two 500 cubic yard scows, one 1,000 horsepower tug, one 550 horsepower tug and a launch. Labor costs were based on one ten hour shift per day, six days per week. Values also include mobilization and demobilization costs and a contractor profit of 10 percent.

Table 4-2

Plan A

Dredging 14,350 c.y. of ordinary material @ \$8.95/c.y.	\$128,400
Contingencies (15%)	19,300
Engineering and Design	10,300
Supervision and Administration	10,300
TOTAL	\$168,300

Plan B

Dredging 16,520 c.y. of ordinary material @ \$8.95/c.y.	\$147,900
2,670 of ledge @ \$110./c.y.	293,700
Contingencies (15%)	66,200
Engineering and Design	35,300
Supervision and Administration	35,300
Aids to Navigation	4,000
TOTAL	\$582,400

Plan C

Dredging 30,870 c.y. of ordinary material @ \$7.25/c.y.	\$223,800
2670 c.y. oc ledge @ \$110./c.y.	293,700
Contingencies (15%)	77,600
Engineering and Design	41,400
Supervision and Administration	41,400
Aids to Navigation	4,000
TOTAL	\$681,900

Plan D

(Bar Island Thoroughfare)

Dredging 1,450 c.y. rock @ \$110/day	\$159,500
8,950 c.y sand & gravel @ \$8.95/day	30,100
Contingencies (15%)	35,900
Engineering and Design	19,200
Supervision and Administration	19,200
Aids to Navigation	10,000
TOTAL	\$323,900

Plan E
(Breakwater)

Armor Stone 2,120 tons @ \$29./ton	\$ 61,500
Core and Blanket Stone 6,750 tons @ \$19./ton	128,200
Bedding Stone 2,590 tons @ \$21.50/ton	55,700
TOTAL COST OF MATERIALS	<u>\$245,400</u>
Contingencies (15%)	36,800
Engineering and Design	19,600
Supervision and Administration	19,600
Aids to Navigation	1,000
TOTAL	<u>\$322,400</u>

MAINTENANCE DREDGING

19. The four plans which entail channel and anchorage dredging (Plans A, B, C and D) all would require periodic maintenance dredging.

20. Following initial dredging the anchorage areas and the channel will tend to shoal or fill in because of settlement of side slopes, deposition of material derived from upland erosion, and the actions of currents.

21. Channel side slopes will be designed in such a way as to enhance long-term stability, although changes to the bottom contours will occur over time resulting in a gradual flattening of the slopes. Strong wave or current action occurring during storms may result in the movement of bottom sediments of a silty nature. The propeller wash and waves produced by passing vessels will also tend to disturb the harbor and channel bottom, resulting in redistribution of bottom sediments.

22. The rate of shoaling in Corea Harbor and the channel has been estimated from condition surveys at one percent. Estimates were based on maintenance dredging at 25-year intervals, which would require removal of 25 percent of the material originally dredged during the improvement construction. Interest and amortization costs are based on a rate of 7-3/8 percent.

23. Maintenance dredging of the existing project has been estimated at 8,000 c.y. at 25-year intervals. Maintenance of both the existing and proposed projects is expected to take place at the same time.

Table 4-3
Maintenance Costs

Plan A
(Northern Anchorage)

Annual Charges (7-3/8% of first cost)	\$12,800
Maintenance 150 c.y./yr. @ \$15.70/c.y.	<u>2,400</u>
TOTAL ANNUAL COST	\$15,200

Plan B
(South Anchorage and Channel)

Annual Charges (7-3/8% of first cost)	\$44,200
Maintenance 165 c.y./yr. @ \$15.70/c.y.	2,600
Maintain Aids to Navigation	<u>1,000</u>
TOTAL ANNUAL COST	\$47,800

Plan C
(Plans A and B)

Annual Charges (7-3/8% of first cost)	\$51,800
Maintenance 310 c.y./yr. @ \$12.40/c.y.	3,800
Maintain Aids to Navigation	<u>1,000</u>
TOTAL ANNUAL COST	\$56,600

Plan D
(Bar Island Thoroughfare)

Annual Charges (7-3/8% of first cost)	\$24,600
Maintenance 100 c.y./yr. @ \$19.00/c.y.	1,900
Maintains Aids to Navigation	<u>2,000</u>
TOTAL ANNUAL COST	\$28,500

Plan E
(The Breakwater)

24. Annual costs associated with the proposed breakwater would include annual charges based on an interest rate of 7-3/8%, and the cost of repairs to the structure because of damage to the armor stone which must be replaced.

Annual Charges (7-3/8% of first cost)	\$24,500
Maintenance 50 tons @ \$75./ton	<u>3,800</u>
TOTAL ANNUAL COST	\$28,300

DISPOSAL OF DREDGED MATERIAL

24. A total of four sites was investigated as possible locations for disposal of the dredged material. There were two sites on land, Sites #1L and #2L, and two ocean disposal sites, Sites #1A and #2A.

25. The location of Site #1L is shown in Figure 4-15. This site is owned by the town of Gouldsboro. For several years the residents of Gouldsboro have desired to construct a public landing at Site #1L, and it was considered that the dredged material could be used as part of the fill needed for this project. Site #1L is located about 6.7 miles from the dredging site. The roads between the dredging site and Site #1L are narrow and quite rough. This, coupled with the questionable availability of dredged material to be transported in a dump truck without creating a spillage problem, made Site #1L questionable. Also, provisions would have to be made to prevent silt from reaching the water as a result of flowing overland.

26. Site #2L, as shown in Figure 1-16, is a State approved sanitary landfill owned and operated by a private individual of Gouldsboro. The dredged material would be used as intermediate cover at this site.

27. Ocean disposal Site A, shown in Figure 4-17, was assessed for consideration as a disposal site for dredged rock. Since the ocean bottom at Site A is naturally rocky, deposition of additional rock would be compatible with existing conditions. Additionally, the rock disposed of at Site A would be of potential value to increasing the size of the area's lobster habitat. Site A is therefore recommended for disposal of all rock removed during construction of navigation improvements in Corea Harbor.

28. Ocean disposal site B, also shown in Figure 4-17, was used in 1953 when maintenance dredging of Corea Harbor was conducted. Only ordinary material, mud, sand, and gravel, would be considered for disposal at Site B. As discussed in the Environmental Assessment, bottom currents in this area are not very significant indicating that any material disposed at this site would remain within the designated site. Site B is therefore recommended for disposal of all mud, sand, and gravel removed during construction of navigation improvements in Corea Harbor.

SEISMIC REFLECTION SURVEY

29. During the period of 25-28 September 1980, a seismic reflection survey was conducted across a low water bar between Bar Island and Young's Point near Corea Harbor, Maine. This survey was conducted in an attempt to obtain subsurface data pertaining to the feasibility of constructing a low water channel through the bar.

EQUIPMENT EMPLOYED

Navigation

30. Navigation, vessel control and post operational trackline reconstruction were accomplished employing one range of a Cubic "Autotape" DM-40A dual range electronic positioning system in conjunction with a Nikon NT-2A optical theodolite.

31. "Autotape" range measurements are obtained by using a microwave phase comparison between the shipboard interrogator unit and the shore-based responders. The ranges are automatically displayed in meters by the interrogator unit at a one-second rate. The accuracy of the measured ranges is nominally ± 0.5 meter and is virtually unaffected by atmospheric conditions.

Bathymetry

32. Precision water depth measurements were acquired employing a Raytheon Model DE-719B survey fathometer. This instrument incorporates both tide and draft corrections plus a calibration capability for local water mass sound speed. The sound speed calibration is accomplished by bar checks at several depths prior to commencement of survey operations each day. Subsequent bar checks during the course of daily operations will verify consistent water mass sound speed and retention of sound speed calibration.

Seismic Reflection Profiles

33. Seismic reflection data was obtained employing an OSI model 300 high resolution boomer system. This system consists of an EG&G/OSI high resolution boomer transducer mounted on a "sled", and OSI 300 joule boomer/sparker energy source, and OSI 10-element receiving array with a one-foot spacing between each hydrophone element, a Krohn-Hite band-pass filter, and a Giffit 4000t wet paper graphic recorder. This system has the ability to discriminate between bottom and subbottom reflectors with a resolution of 12 to 18 inches.

Vessel

34. Survey operations were conducted from the 21-foot, twin engine, R/V Ready. This vessel's shallow draft, large enclosed cabin and dual power dependability made it well suited for operations at this site.

FIELD OPERATIONS

Horizontal Control

35. Due to the fact that there were no established Maine State coordinate triangulation stations accessible in the vicinity of the survey

site, three control points (OS-1, OS-2, and OS-3) were established in the site and assigned an arbitrary grid system in the area with the origin at OS-3.

36. Figure 4-18 shows the approximate location of the three points along with the values of the interior angles measured at each station, the length of the measured side OS-2 to OS-3 and the coordinates of each point. Figures 4-19 through 4-21 are sketches of the locations of each point in relation to the surrounding landmarks.

37. For this survey, tracklines and vessel control were established and maintained using the bore site methods. This method incorporates the use of an optical transit and an electronic distance measuring instrument; in this case, one range of the "Autotape" system.

38. Operationally, the transit and "Autotape" responder are set on a control point with known coordinates. A predetermined angle calculated from a known backsite is then turned establishing a "bore site" along the proposed trackline. The transit operator, in turn, guides the vessels along with trackline via radio communications with the helmsman while the "Autotape" ranges are annotated on all data records. In this manner the vessels can be controlled very precisely along a desired trackline and the grid coordinates for the location of each fix can be easily calculated for plotting purposes.

39. At the Corea Harbor site the bore sight control station was at OS-2; OS-3 was used as a backsite.

40. Using this technique, a total of 17 lines was run across the bar during which bathymetric and seismic reflection data were acquired concurrently.

Vertical Control

41. The effort required to reference all data accurately to mean low water (MLW) or other designated vertical reference data requires two tasks.

42. The first involves calibration of the depth sounder for local water mass sound speed and the second, monitoring the tidal heights relative to the vertical datum during the data acquisition period.

43. During the Corea Harbor survey the Raytheon fathometer was calibrated for local water mass sound speed by performing a bar check at twenty feet with an additional calibration measurement made at ten feet. A bar check was performed prior to commencement and at the termination of the data acquisition period.

44. Tidal heights were measured by a Sea Data TDR digital water level gauge. This instrument made measurements of the water level relative to its installed elevation at five-minute intervals throughout the day. As no

benchmarks were available from which to directly obtain the MLW elevation of the TDR, maxima and minima measured by the instrument were correlated with the predicted maxima and minima published in NOAA's 1980 tide tables for Corea, Maine, to obtain water levels relative to MLW during the survey period.

DATA

Data Reduction

45. The first step in data reduction involved reconstruction of the survey vessel's tracklines. This was accomplished by using the angle of the bore sight line and the recorded ranges to compute the grid coordinates of each fix. The fixes were in turn plotted on a flat sheet and labeled with the corresponding fix number recorded on the graphic records.

46. Water depths were obtained from the fathometer records by picking maxima, minima, and inflection points along the bottom profile. These recorded depths were, in turn, corrected for both sound speed calibration and tidal heights prior to final tabulation. The corrected depths were then plotted on the control sheets and contoured at a one-foot interval.

47. Reduction of the seismic data was accomplished in two steps. First, mylar overlays were attached to the records on which the bottom and inferred bedrock reflectors were traced. As no physical data were available concerning the elevation of the bedrock in the site, the bedrock reflector traced was an interpretative feature. Interpretation was based on the nature of the reflectors as displayed on the records and on trends in reflectors that were known to correspond to the bedrock by visual observation at low tide.

48. Since precise water depth measurements were obtained from the fathometer, the inferred bedrock trace was picked relative to the bottom reflection by measuring the travel time interval between the bottom bedrock and bedrock reflections as scaled off the vertical dimension of the seismic records.

49. The second step in this process involved conversion of these travel times to actual depths below the bottom. The "time-to-depth" conversions are made by multiplying the measured travel time by the propagation velocity of a compressional wave through the overlying sediment.

50. As an approach to determining a realistic sound speed value for the sediments in the survey area, the following data were considered. During periods of low tide when the bar was exposed, several excavations were conducted. These "digs" revealed the unconsolidated component of the bar to be composed of fine to medium sized sands with a surface cover of coarse pebbles and cobbles. These sediment types exhibit characteristic acoustic velocities between 5,900 feet/second to 5,600 feet/second

(Hamilton, 1969). Considering the objectives of this survey, a velocity of 5,600 feet/second was used in order to produce conservative measurements of the bedrock elevation.

51. Therefore, sediment thicknesses existing between the bottom and bedrock reflections were calculated using 5,600 feet/second for the sediment velocity. The computed thicknesses were, in turn, added to the measured water depth at each point giving the resulting depth to bedrock which were then plotted on the prepared control sheet and contoured at a five-foot interval.

Data Presentation

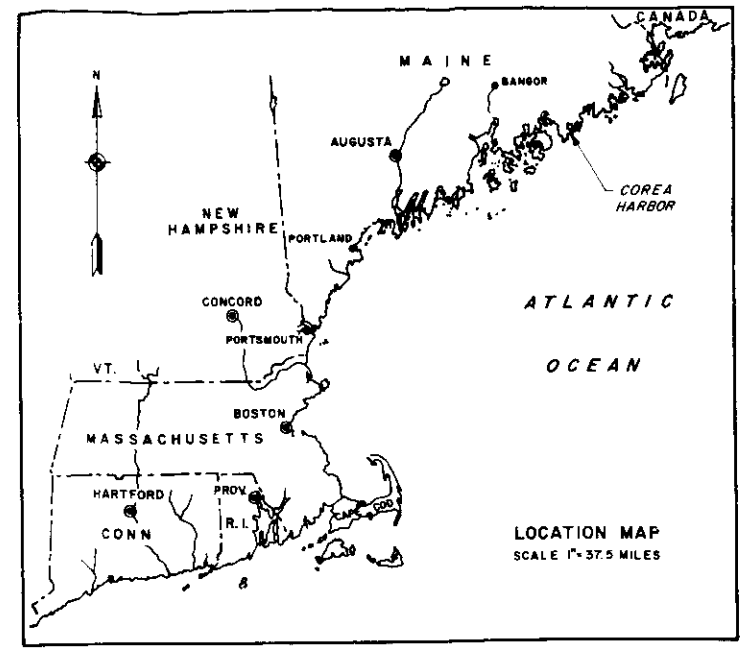
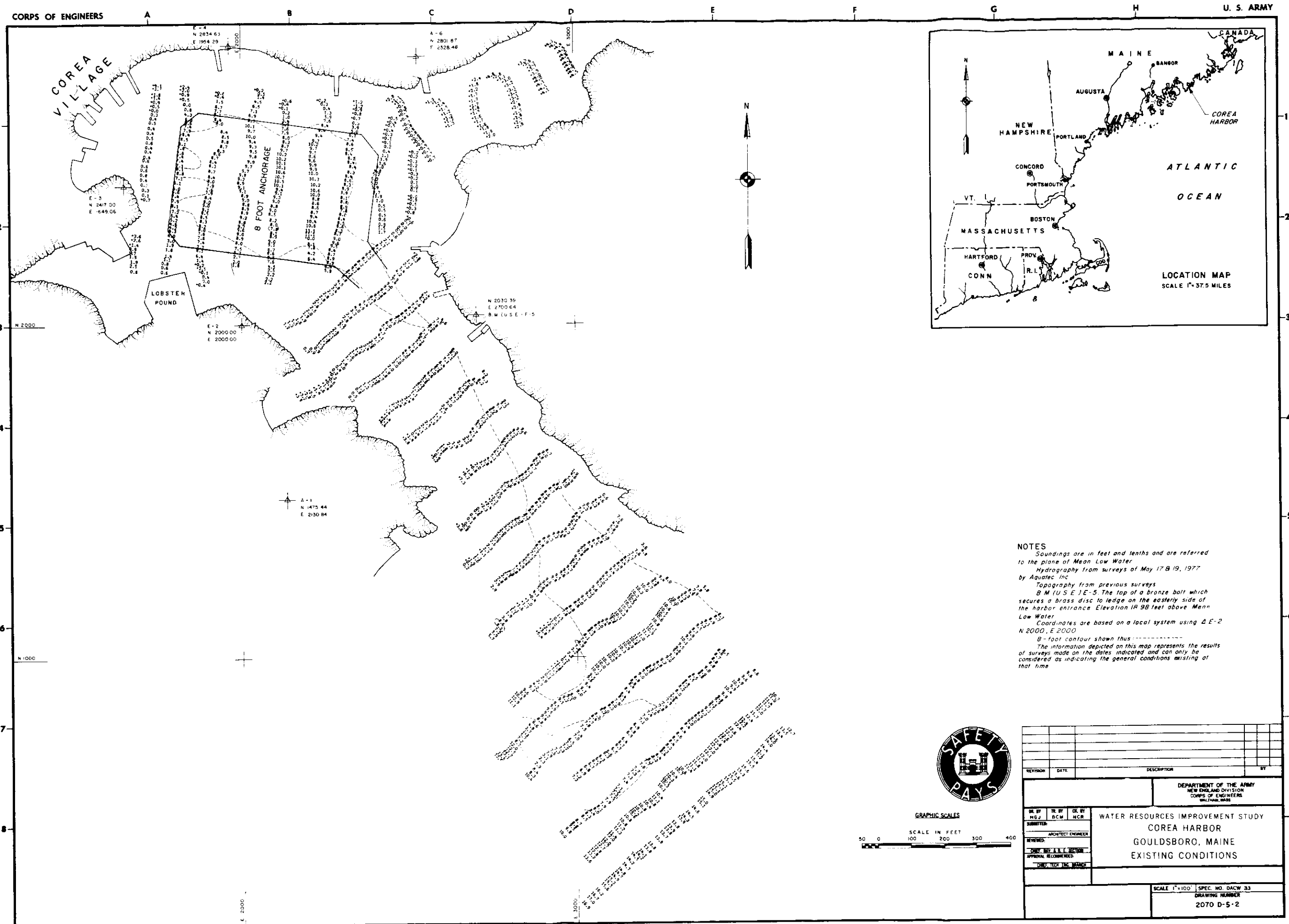
52. Figure 4-13 is a contoured bathymetric chart of the site presented at a horizontal scale of 1"= 50' and contour interval of one foot.

53. Figure 4-14 is a contour sheet of the bedrock surface as determined from the seismic data. It is presented at a horizontal scale of 1"= 50' and a contour interval of five feet.

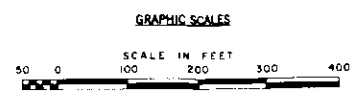
DISCUSSION

54. As presented on the bedrock map, there appears to be a roughly linear bedrock structure trending approximately north-northwest by south-southeast. This feature exhibits a nominal 3-4 foot relief relative to the rock on either side with areas of greater relief along the trend. The base elevation of the structure appears to be approximately 7-8 feet below MLW with several local areas extending above MLW datum.

55. It is recommended that physical borings be conducted along this feature to verify its elevation and trend before construction plans are determined.



NOTES
 Soundings are in feet and tenths and are referred to the plane of Mean Low Water.
 Hydrography from surveys of May 17 & 19, 1977 by Aquatic, Inc.
 Topography from previous surveys.
 B.M. (U.S.E.) E-5. The top of a bronze bolt which secures a brass disc to ledge on the easterly side of the harbor entrance. Elevation 19.98 feet above Mean Low Water.
 Coordinates are based on a local system using Δ E-2 N 2000, E 2000.
 8-foot contour shown thus: - - - - -
 The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at that time.



REVISION				DATE	DESCRIPTION	BY
DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS WALTHAM, MASS.						
DESIGNED BY DRAWN BY CHECKED BY APPROVED BY	TR. BY DCW MCR	CK. BY NCR	WATER RESOURCES IMPROVEMENT STUDY COREA HARBOR GOULDSBORO, MAINE EXISTING CONDITIONS			
SCALE 1"=100' SPEC. NO. DACW 33 DRAWING NUMBER 2070 D-5-2						

FIGURE 4.1

SUMMARY OF TEST BORING FD-1

ELEVATION OF TOP OF BORING +1.0' MLW

HAMMER WEIGHT 350 LBS.

ELEVATION OF BOTTOM OF BORING -24.0' MLW

HAMMER DROP 18"

DEPTH	BLOWS PER FOOT	CLASSIFICATION OF MATERIAL
0		
5		
10		
15		
20		
25		

FIGURE 4-2

SUMMARY OF TEST BORING FD-2

ELEVATION OF TOP OF BORING -4.0' MLW

HAMMER WEIGHT 350 LBS.

ELEVATION OF BOTTOM OF BORING -23.0' MLW

HAMMER DROP 18"

DEPTH	BLOWS PER FOOT	CLASSIFICATION OF MATERIAL
0	WEIGHT OF HAMMER & TOOLS	GREYISH-BROWN ORGANIC SILTY FINE SAND, MOIST WITH SHELLS & MARINE ODOR
5	WEIGHT OF HAMMER & TOOLS	GREYISH-BROWN FINE SANDY ORGANIC SILT
10		GREYISH-BROWN FINE SILTY ORGANIC SAND, MOIST WITH MARINE ODOR
15		GREYISH-BROWN FINE SANDY ORGANIC SILT, MOIST WITH ORGANIC ODOR
20		EXTENT OF EXPLORATION AT 19.0'
25		

FIGURE 4-3

SUMMARY OF TEST BORING FD-3

ELEVATION OF TOP OF BORING -1.3' MLW

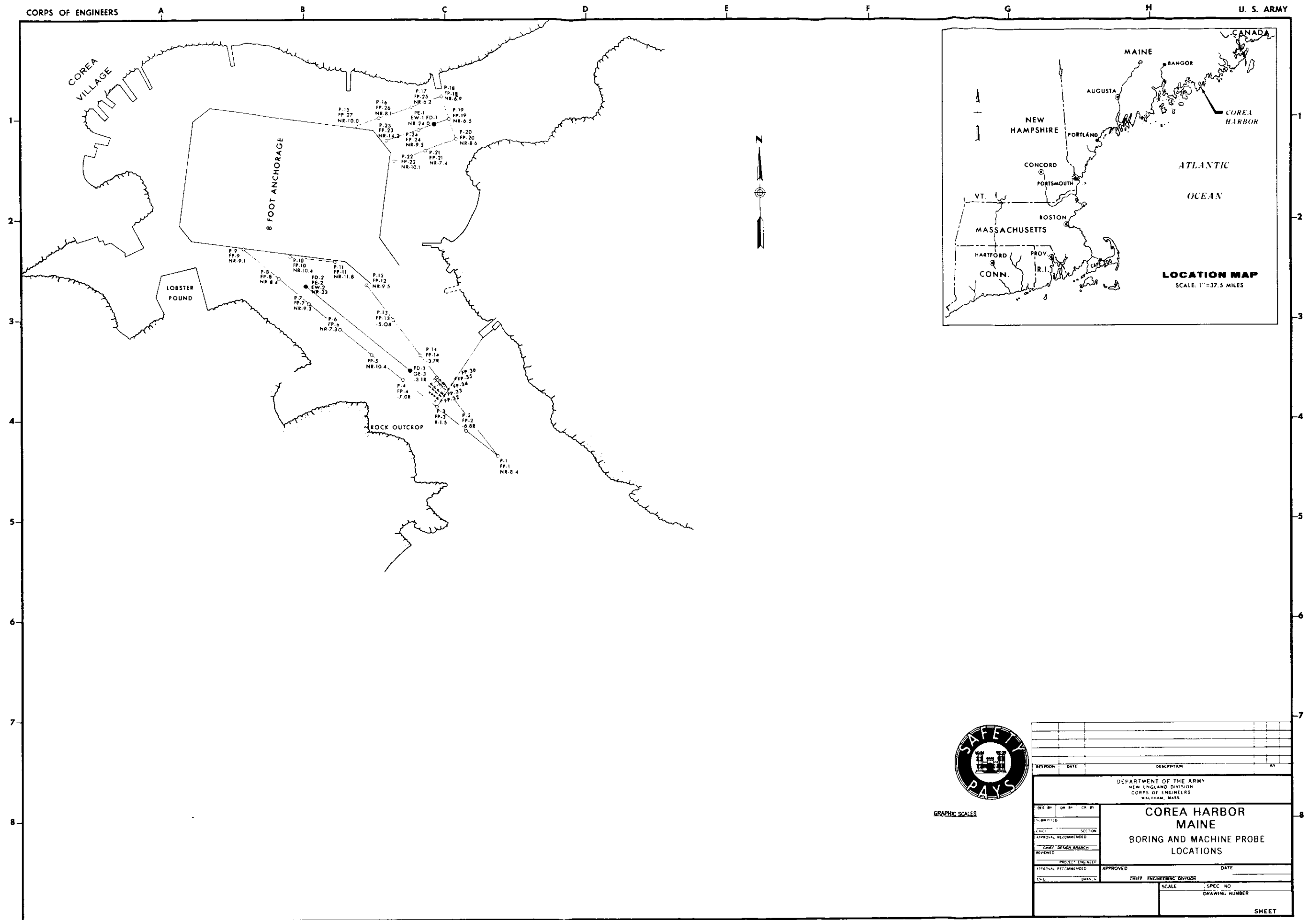
HAMMER WEIGHT 350 LBS.

ELEVATION OF BOTTOM OF BORING -11.3' MLW

HAMMER DROP 18"

DEPTH	BLOWS PER FOOT	CLASSIFICATION OF MATERIAL
0	WEIGHT OF HAMMER & TOOLS	GREYISH-BROWN GRAVELLY SILTY SAND, WET WITH MARINE ODOR
5	REFUSAL-LEDGE AT 1.8' RUN ROTARY DIAMOND DRILLS	<u>RED GRANITE</u> SLIGHTLY WEATHERED TO COARSE GRAIN, HIGH FELDSPAR CONTENT, HARD WHEN FRESH, JOINTS HIGHLY FISTOONED
10		EXTENT OF EXPLORATION AT 10.0'
15		
20		
25		

FIGURE 4-4



LOG OF PROBES FOR CONDITION SURVEY

SITE: COREA HARBOR, ME.
HAMMER: 350 POUNDS

SURVEY DATE: 17-27 APRIL 1978
FALL: 18 INCHES

PROBE NO.	BOTTOM ELEV. (MLW)	DEPTH BELOW BOTTOM												EXTENT OF PROBE
		1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	
		BLOWS PER FOOT												
FP-1	-6.5'	2	3	—	—	—	—	—	—	—	—	—	—	-8.5' MLW
FP-2	-3.2'	*	2	4	8/.6'	×	×	×	×	×	×	×	×	-6.8' MLW
FP-3	-1.5'	×	×	×	×	×	×	×	×	×	×	×	×	-1.5' MLW
FP-4	-1.8'	2	7	21	7	10	20/.2'	×	×	×	×	×	×	-7.0' MLW
FP-5	-1.4'	*	*	*	*	2	2	3	8	8	—	—	—	-10.4' MLW
FP-6	-2.3'	*	*	*	2	4	—	—	—	—	—	—	—	-7.3' MLW
FP-7	-4.4'	*	*	*	*	*/.9'	—	—	—	—	—	—	—	-9.3' MLW
FP-8	-2.4'	*	*	*	*	*	*	—	—	—	—	—	—	-8.4' MLW
FP-9	-8.4'	*	—	—	—	—	—	—	—	—	—	—	—	-9.1' MLW
FP-10	-8.8'	*	*/.6'	—	—	—	—	—	—	—	—	—	—	-10.4' MLW
FP-11	-8.5'	*	*	*	*/.3'	—	—	—	—	—	—	—	—	-11.8' MLW
FP-12	-5.5'	*	1	2	2	—	—	—	—	—	—	—	—	-9.5' MLW
FP-13	-5.0'	×	×	×	×	×	×	×	×	×	×	×	×	-5.0' MLW
FP-14	-3.1'	*/.6' & ×	×	×	×	×	×	×	×	×	×	×	×	-3.7' MLW
FP-15	+0.3'	×	×	×	×	×	×	×	×	×	×	×	×	+0.3' MLW
FP-16	+3.0'	×	×	×	×	×	×	×	×	×	×	×	×	+3.0' MLW
FP-17	+0.3'	×	×	×	×	×	×	×	×	×	×	×	×	+0.3' MLW
FP-18	+1.1'	*	*	4	14	18	55	36	35	—	—	—	—	-6.9' MLW

- NOTES: 1.) × INDICATES SOLID REFUSAL
2.) — INDICATES UNKNOWN BUT BELOW REQUIRED DEPTH
3.) * INDICATES PENETRATION DUE TO WEIGHT OF AW ROD AND 350# HAMMER

LOG OF PROBES FOR CONDITION SURVEY

SITE: COREA HARBOR, ME.

SURVEY DATE: 17-27 APRIL 1978

HAMMER: 350 POUNDS

FALL: 18 INCHES

PROBE NO.	BOTTOM ELEV. (MLW)	DEPTH BELOW BOTTOM												EXTENT OF PROBE
		1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	
		BLOWS PER FOOT												
FP-19	+1.5'	*	*	*	2	1	1	1	1	—	—	—	—	-6.5' MLW
FP-20	+1.4'	*	*	*	*	*	*	*	4	2	3	—	—	-8.6' MLW
FP-21	+0.6'	*	*	*	1	1	1	1	1	—	—	—	—	-7.4' MLW
FP-22	+1.1'	*	*	*	*	*	*	*	*	*	*	*	*/.2'	-10.1' MLW
FP-23	-6.8'	*	*	*	*	*	*	*	*/.4'	—	—	—	—	-14.2' MLW
FP-24	+0.7'	*	*	*	*	*	*	*	*	*	*	*/.2'	—	-10.9' MLW
FP-25	+0.8'	*	*	*	2	7	5	20	—	—	—	—	—	-6.2' MLW
FP-26	+0.1'	*	*	*	*	*	*	*	*	*/.2'	—	—	—	-8.1' MLW
FP-27	-2.8'	*	*	*	*	*	*	*	*/.2'	—	—	—	—	-10.0' MLW
FP-28	-0.2'	×	×	×	×	×	×	×	×	×	×	×	×	-0.2' MLW
FP-29	-1.2'	×	×	×	×	×	×	×	×	×	×	×	×	-1.2' MLW
FP-30	-2.8'	×	×	×	×	×	×	×	×	×	×	×	×	-2.8' MLW
FP-31	-0.2'	×	×	×	×	×	×	×	×	×	×	×	×	-0.2' MLW
FP-32	-1.5'	×	×	×	×	×	×	×	×	×	×	×	×	-1.5' MLW
FP-33	-0.2'	×	×	×	×	×	×	×	×	×	×	×	×	-0.2' MLW
FP-34	-0.4'	×	×	×	×	×	×	×	×	×	×	×	×	-0.4' MLW
FP-35	-1.0'	8	12	28	×	×	×	×	×	×	×	×	×	-4.0' MLW
FP-36	-3.5'	3	14	16	22/.9'	×	×	×	×	×	×	×	×	-7.4' MLW

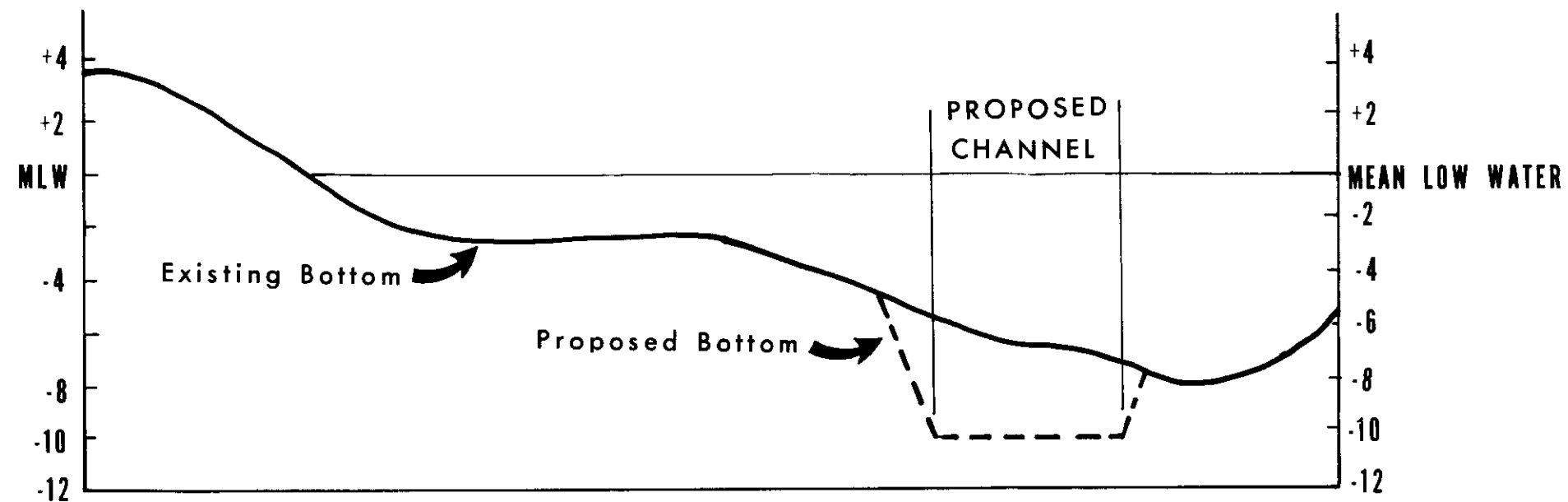
NOTES: 1.) × INDICATES SOLID REFUSAL

2.) — INDICATES UNKNOWN BUT BELOW REQUIRED DEPTH

3.) * INDICATES PENETRATION DUE TO WEIGHT OF AW ROD AND 350# HAMMER

(cont.)

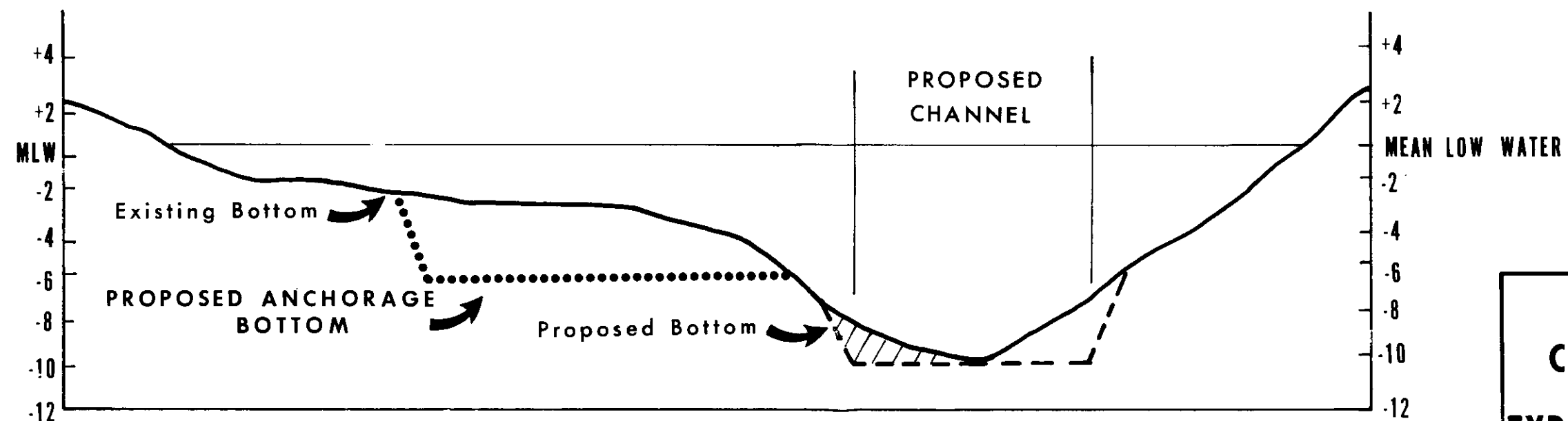
FIGURE 4-7



NOTES: 1.  INDICATES AREA WHERE LEDGE MUST BE REMOVED.

CROSS-SECTION A-A

SCALE: 1" = 6' VERT.
1" = 50' HOR.

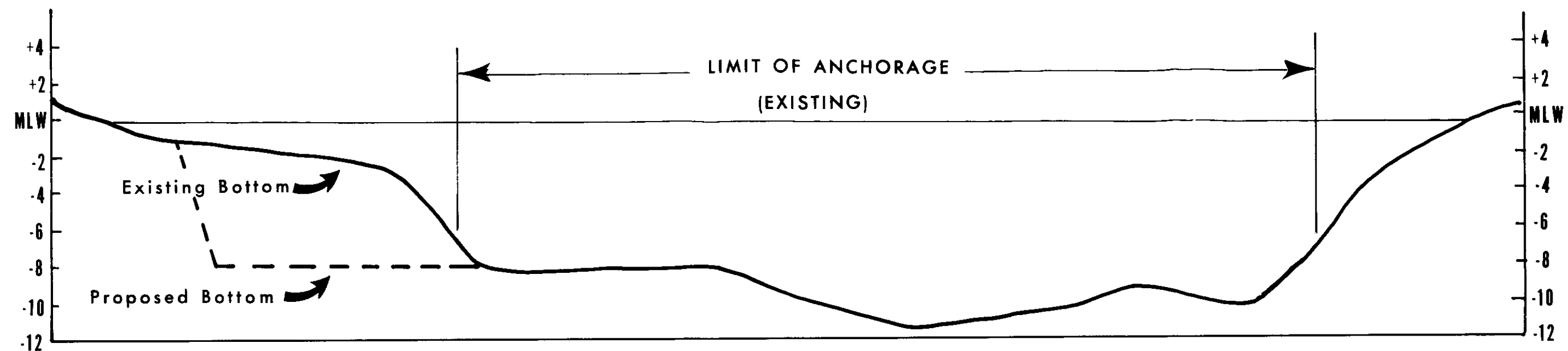


CROSS-SECTION B-B

SCALE: 1" = 6' VERT.
1" = 50' HOR.

COREA HARBOR.ME.
TYPICAL CROSS-SECTIONS

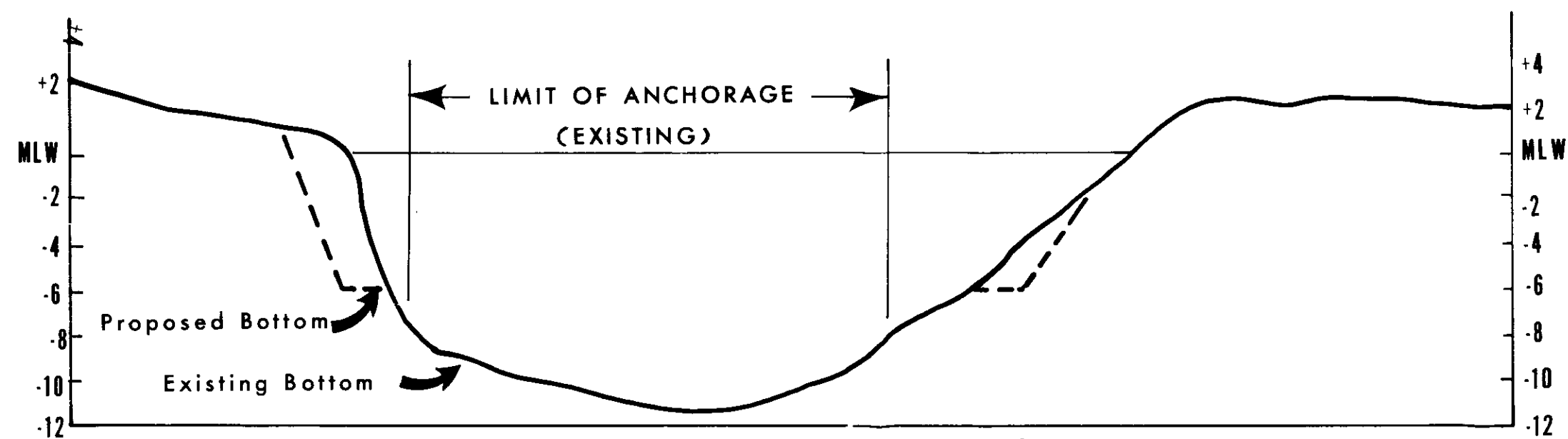
FIGURE 4-8



CROSS-SECTION C-C

SCALE: 1" = 6' VERT.

1" = 50' HOR.



CROSS-SECTION O-O

SCALE: 1" = 6' VERT.

1" = 50' HOR.

**COREA HARBOR.ME.
TYPICAL COSS-SECTIONS**

FIGURE 4-9

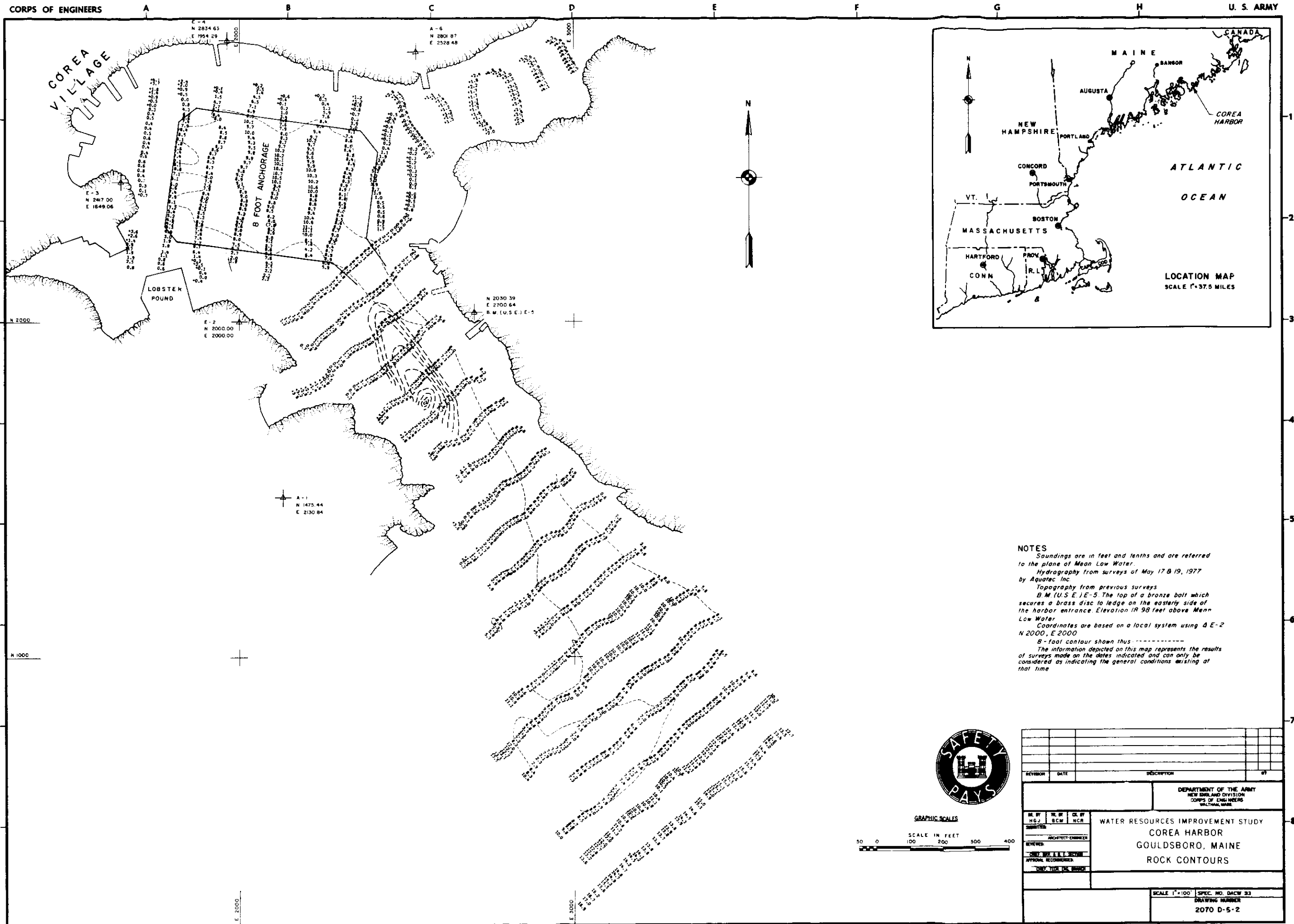
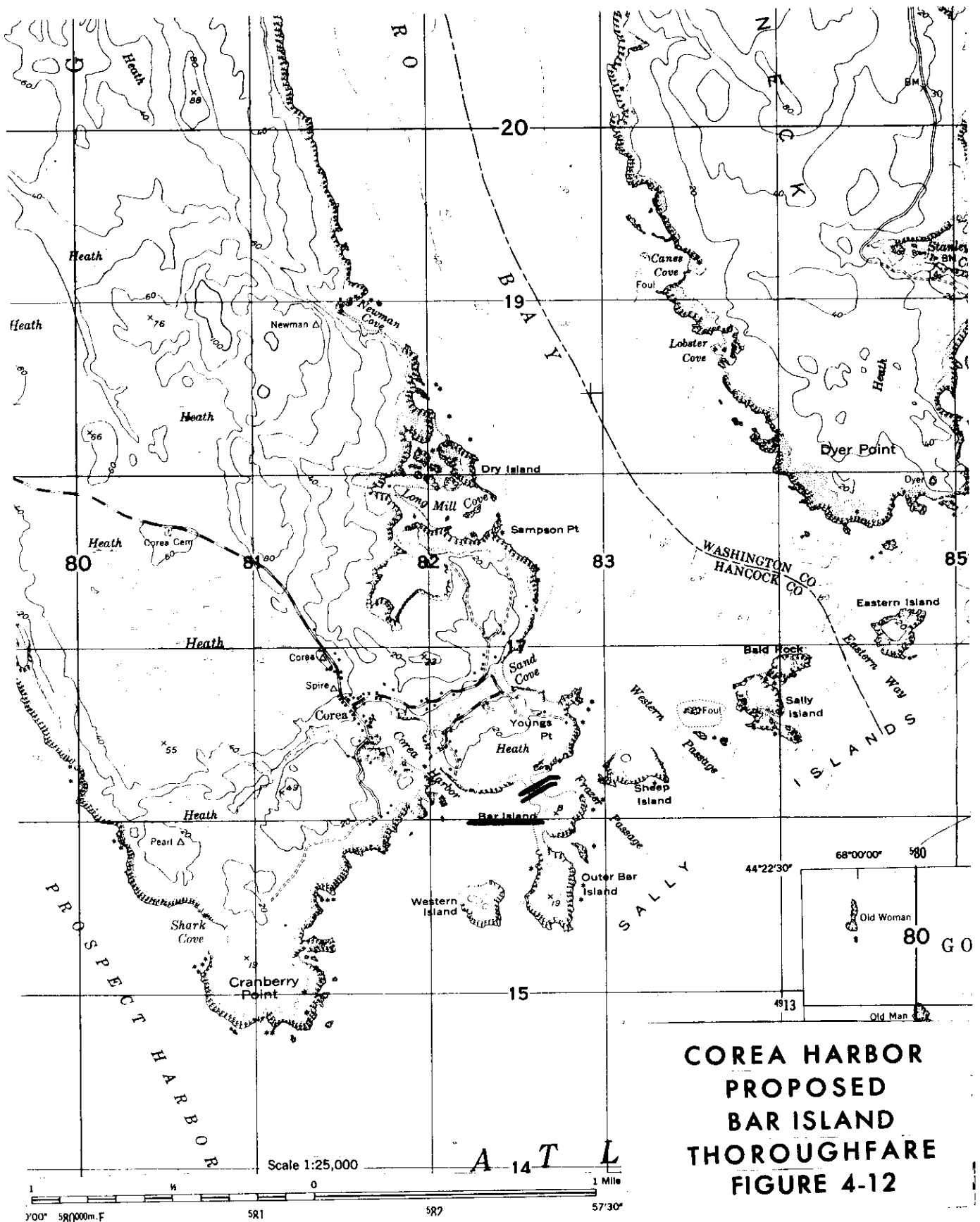


FIGURE 4-11



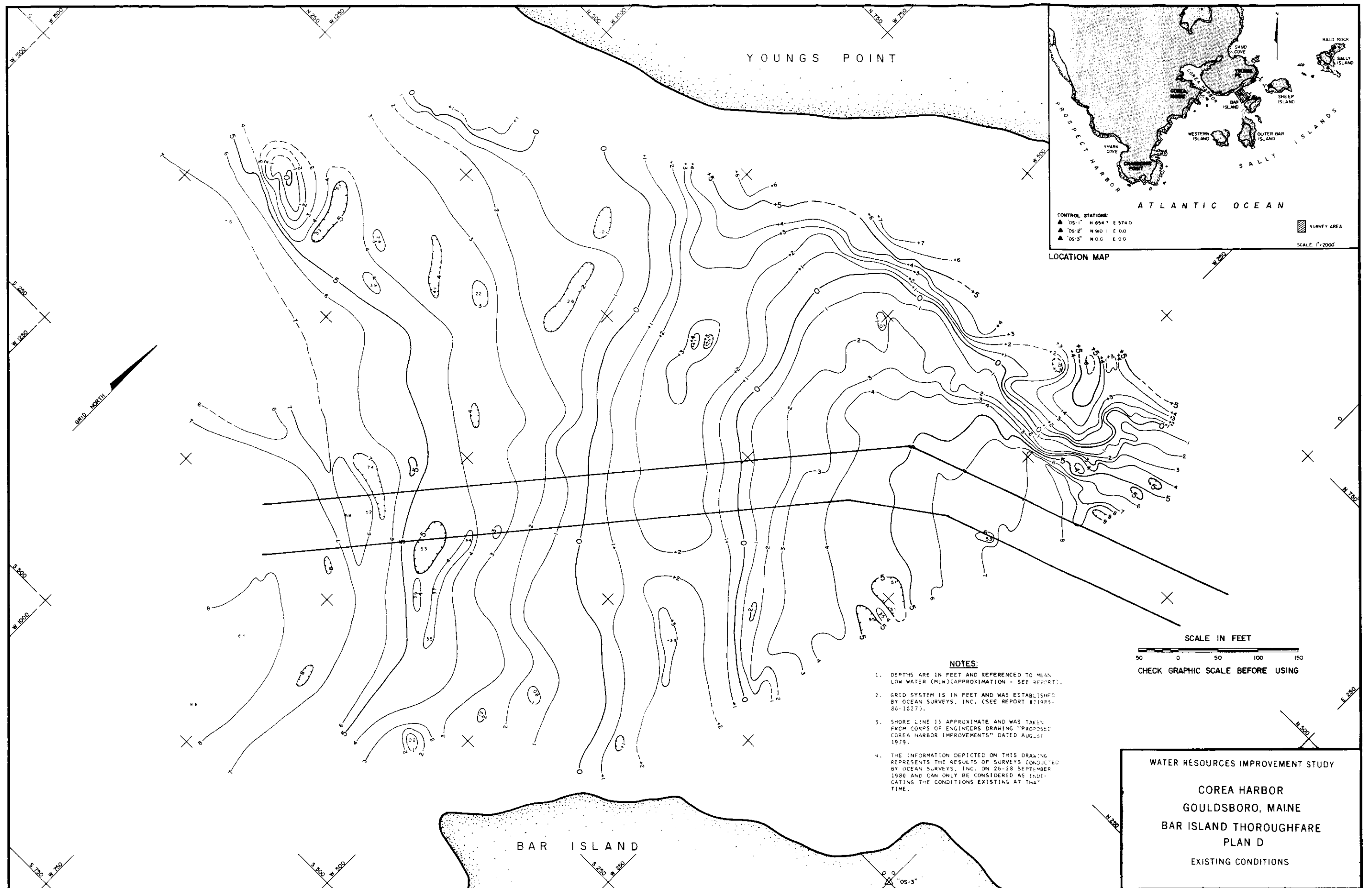


FIGURE 4-13

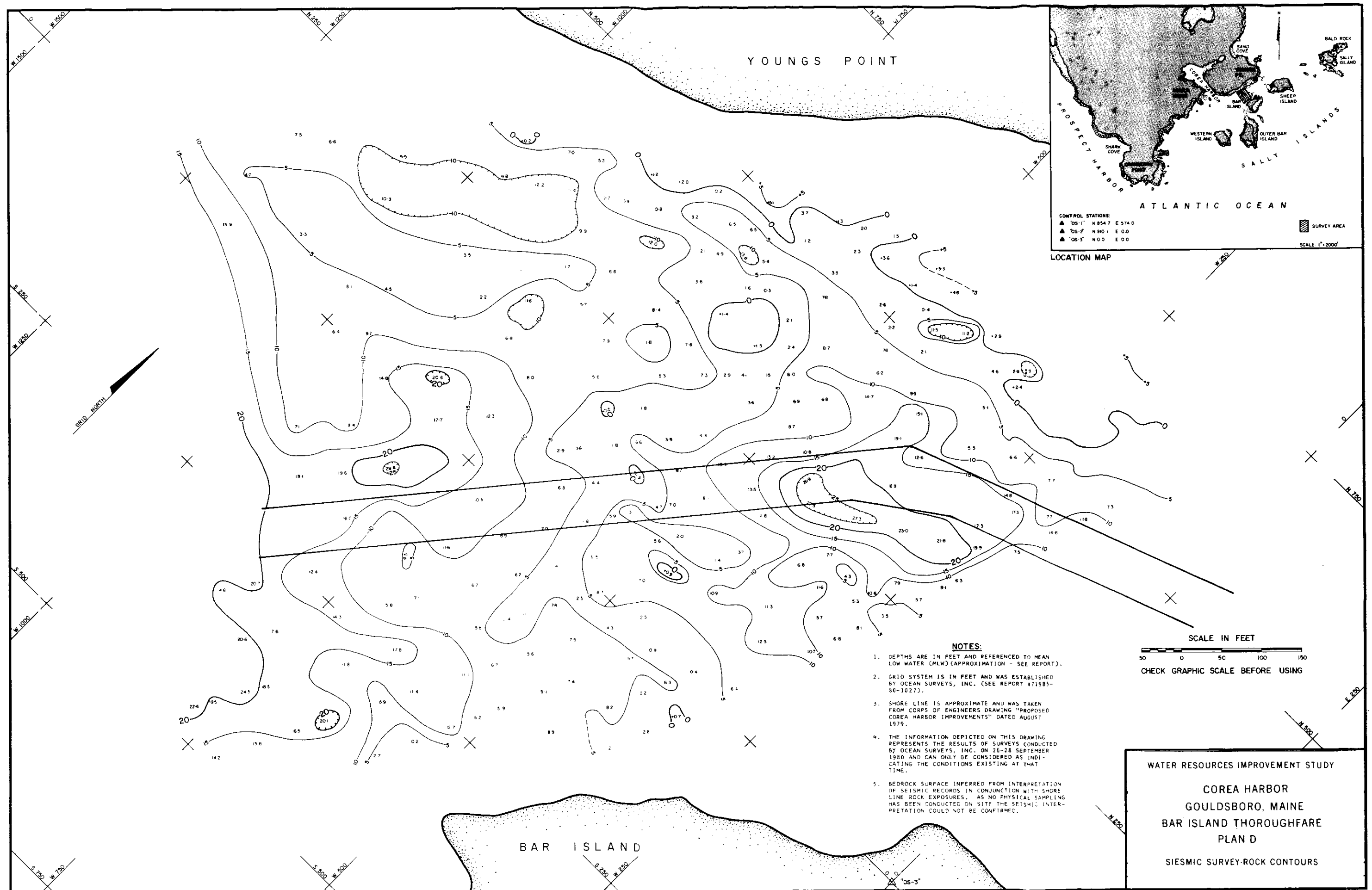


FIGURE 4-14

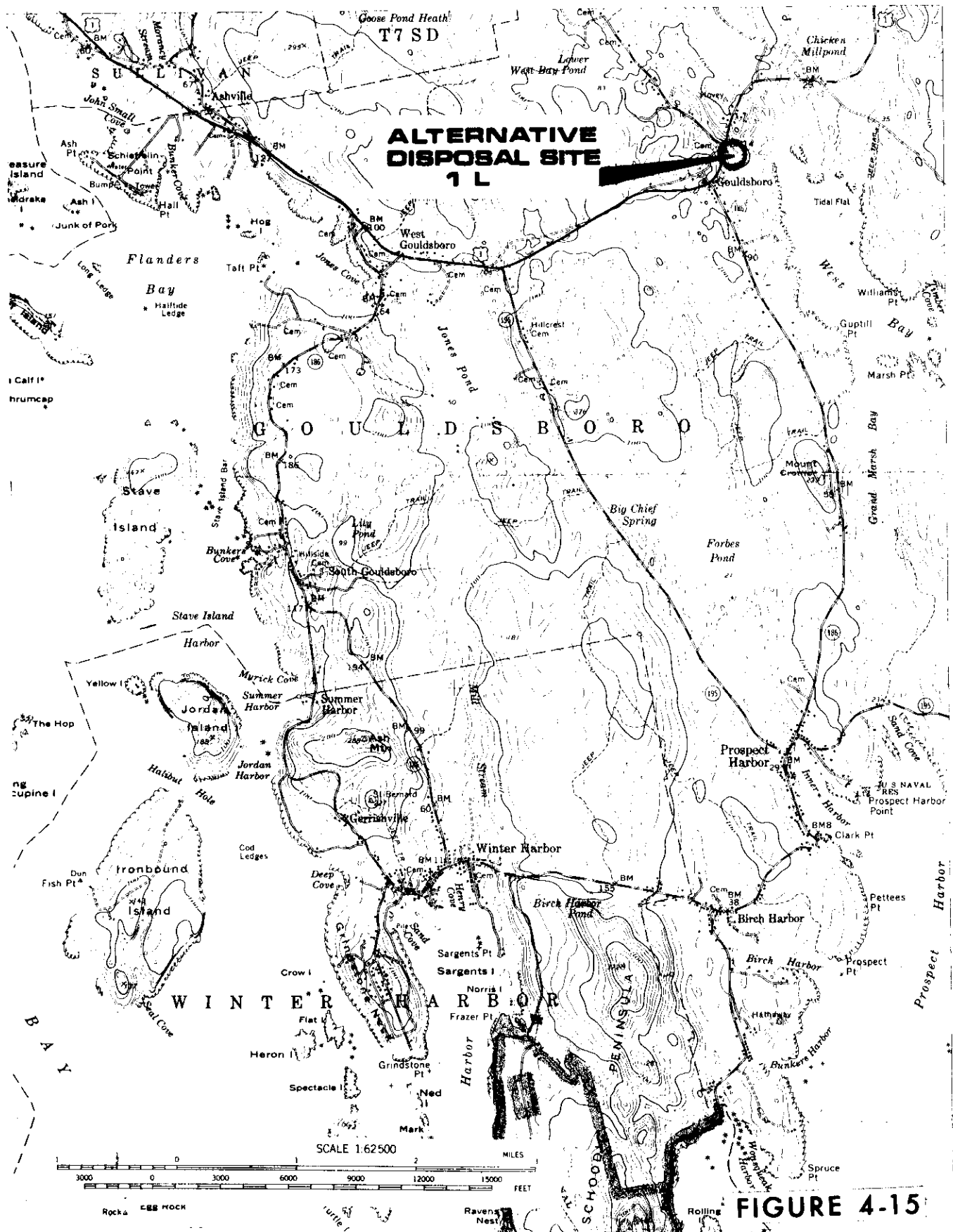


FIGURE 4-15

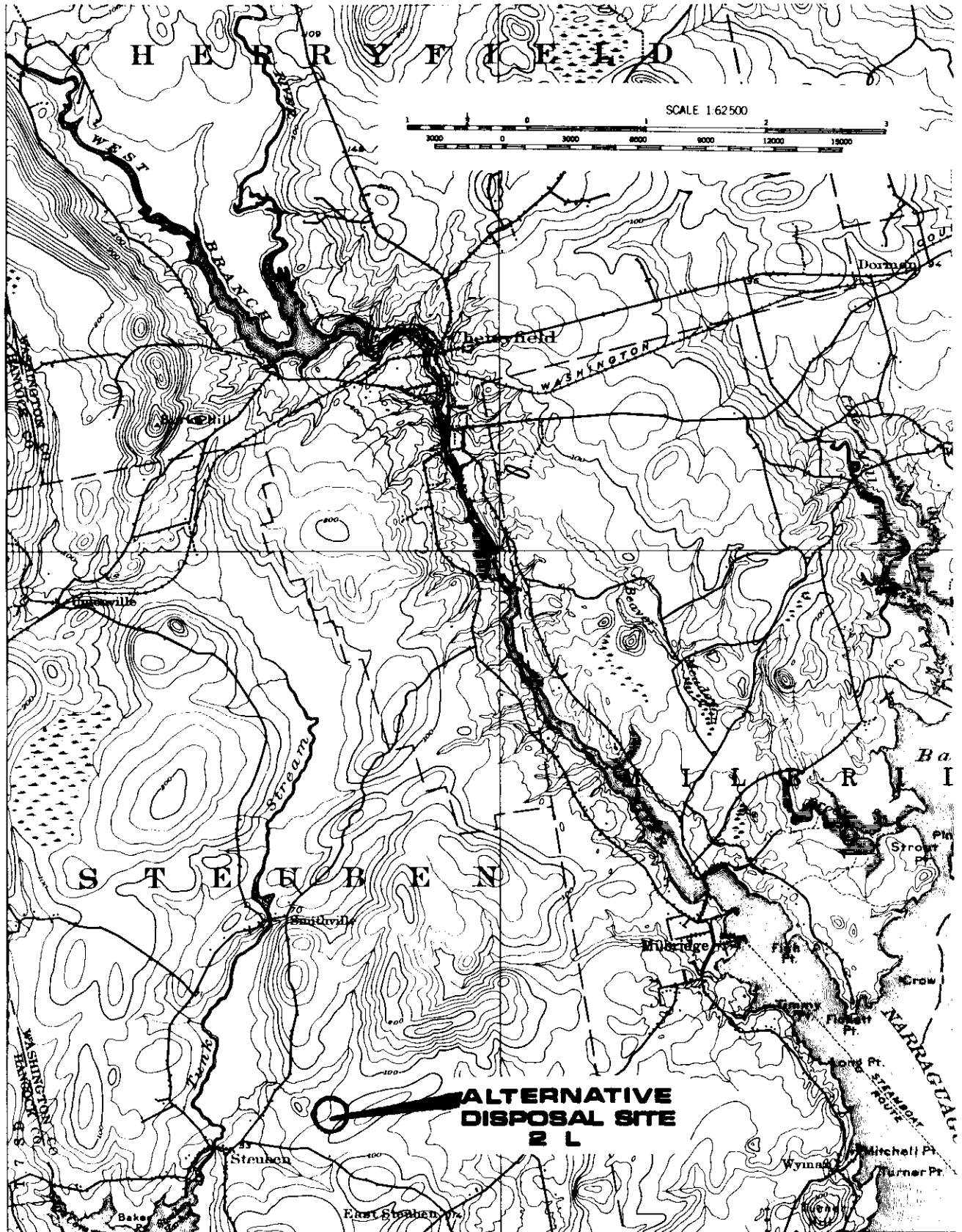


FIGURE 4-16

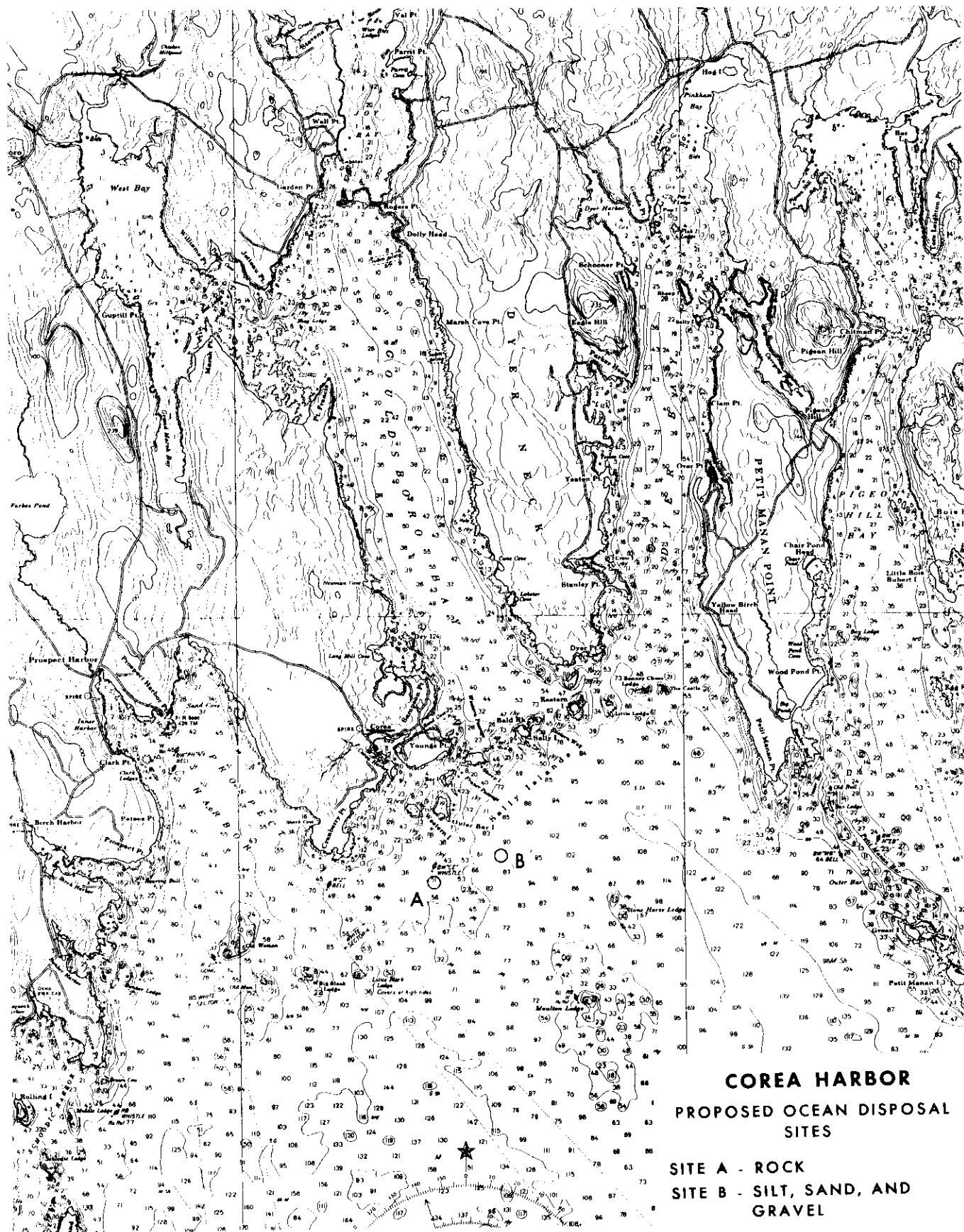
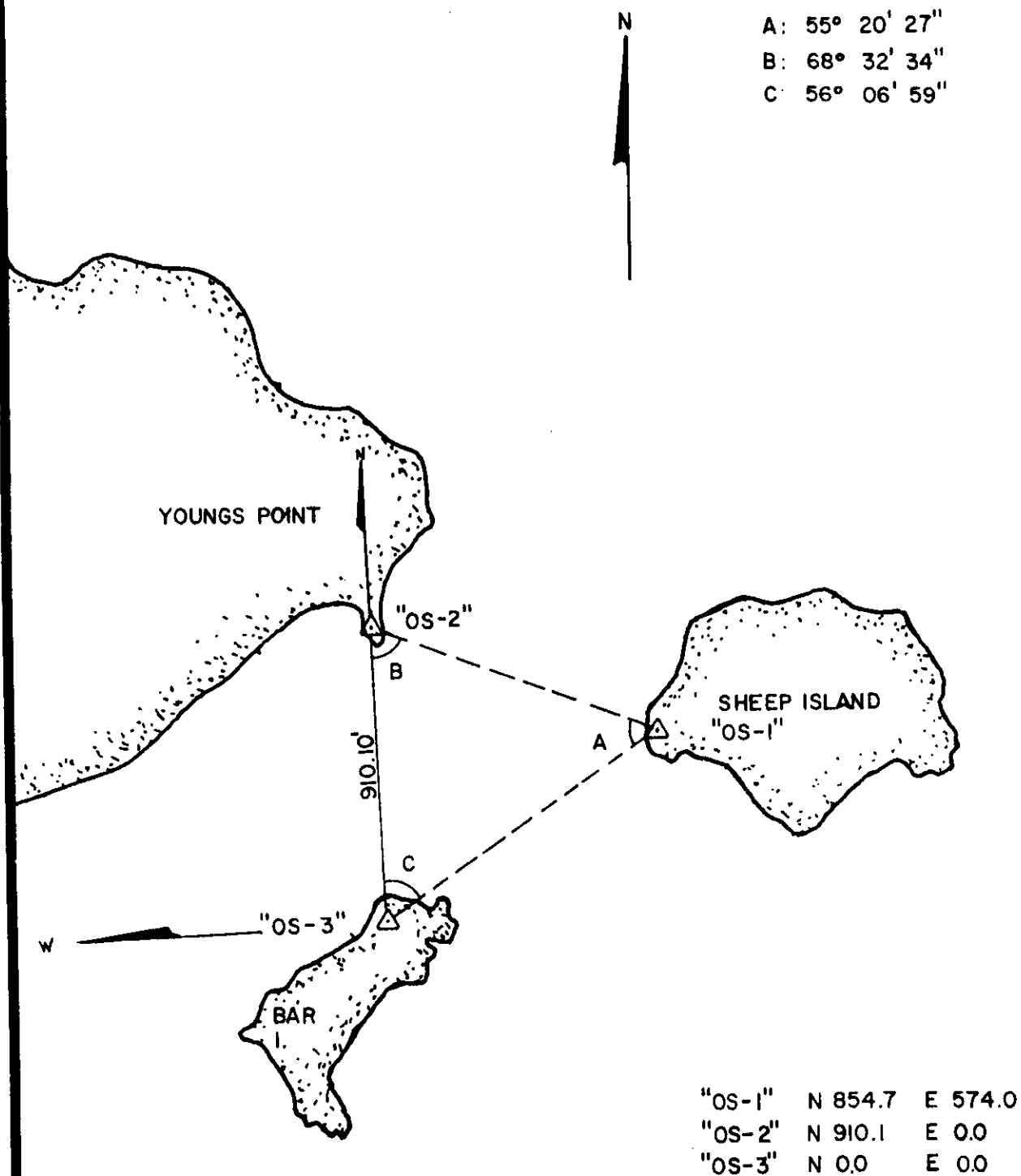


FIGURE 4-17



SCALE	1"=500'	DATE	27-OCT-80
		BY	CRR

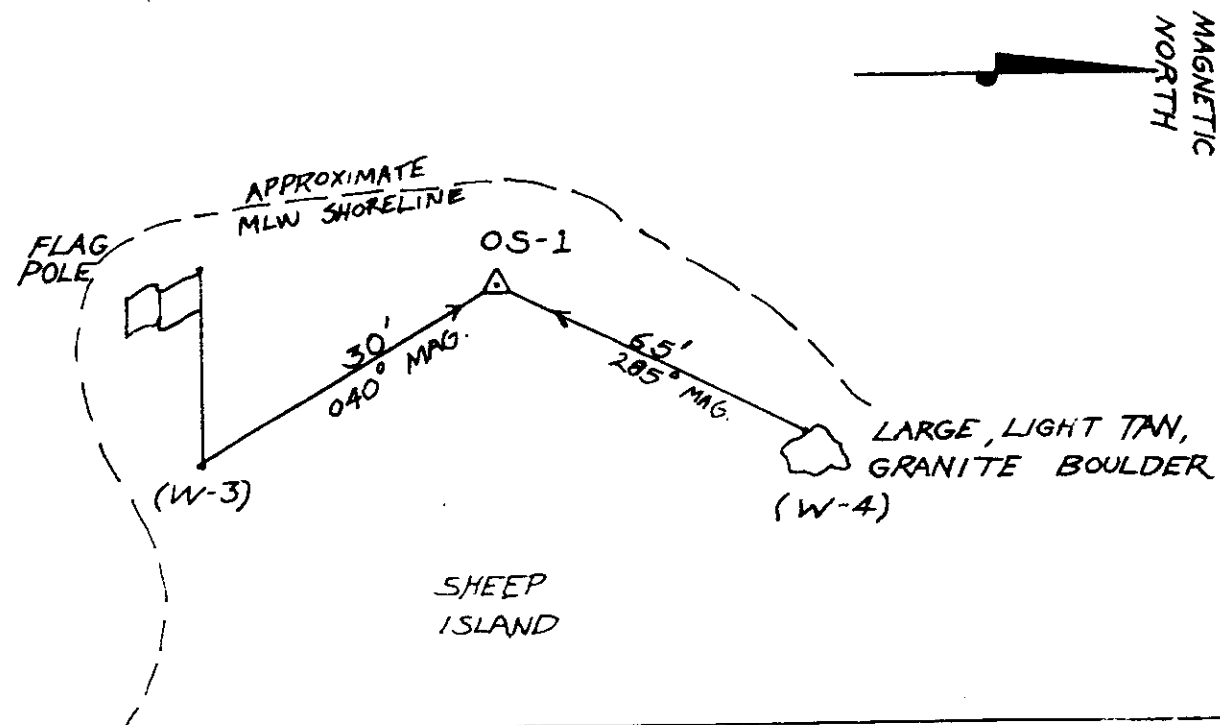
FIGURE 4-18
BAR ISLAND THOROUGHFARE
SURVEY REFERENCE POINT LOCATIONS

LOCATION SKETCH

OS-1

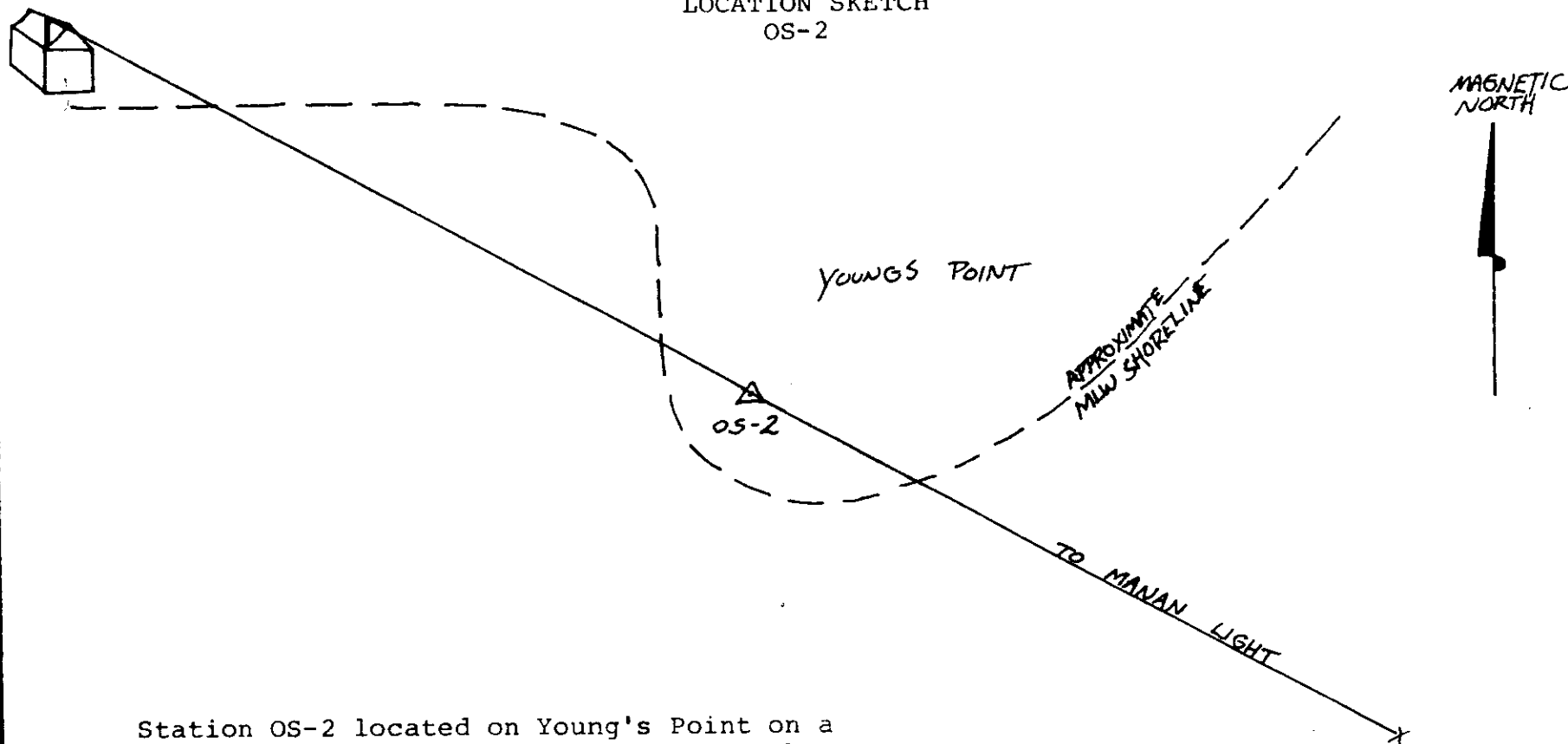
Station OS-1 is located on the southwestern tip of Sheep Island. The point is monumented with a 3/4" steel reinforcing rod cemented into the bedrock.

Witness Station Number 3 (W-3) is a wooden flag pole marked with red paint. Witness Station Number 4 (W-4) is a large, light tan, granite boulder located above the high water mark and marked with red paint.



	DATE 28 OCT 80
SCALE N.A.	BY PMF

FIGURE 4-19
BAR ISLAND THOROUGHFARE
SURVEY REFERENCE POINT #1



Station OS-2 located on Young's Point on a line collinear with the chimney on southwest corner of beach house (See Plate #4) on Young's Point and the Petit Manan Point Lighthouse. Point monumented with 3/4" steel reinforcing rod cemented into bedrock.

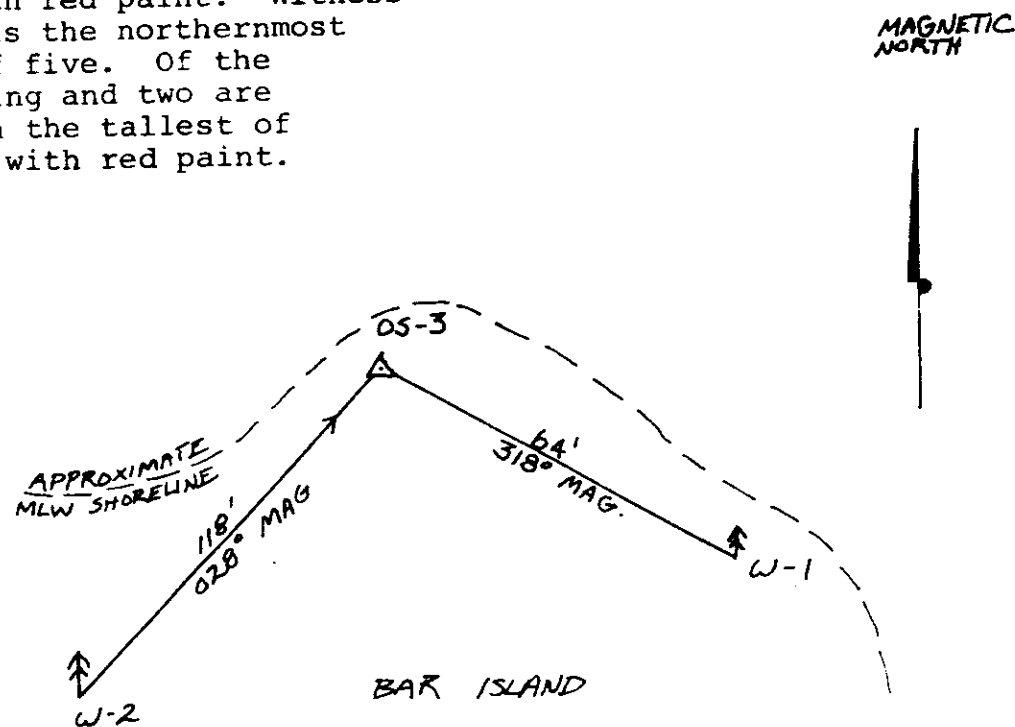
	DATE 28 OCT 80
SCALE N.A.	BY PMF

FIGURE 4-20
BAR ISLAND THOROUGHFARE
SURVEY REFERENCE POINT #2

LOCATION SKETCH

OS-3

Station OS-3 is located on northwest shore of Bar Island Point and is monumented with a 3/4" steel reinforcing rod cemented into the bedrock. Witness Station Number 1 (W-1) is the last fir tree on northeast tip of Bar Island and is marked with red paint. Witness Station Number 2 (W-2) is the northernmost fir tree in a cluster of five. Of the cluster 3 trees are living and two are dead. The witness is on the tallest of the group and is marked with red paint.



	DATE 28 OCT 80
SCALE N.A.	BY PMF

FIGURE 4-21
BAR ISLAND THOROUGHFARE
SURVEY REFERENCE POINT #3

COREA HARBOR
GOULDSBORO, MAINE

DETAILED PROJECT REPORT

ECONOMIC AND SOCIAL ANALYSIS

APPENDIX 5

Prepared by
Department of the Army
Corps of Engineers
New England Division

ECONOMIC AND SOCIAL ANALYSIS

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APPENDIX 5 ECONOMIC AND SOCIAL ANALYSIS

INTRODUCTION

1. This appendix contains three sections. The first section is an analysis of economic conditions of the project area and the economic effects of the various alternative plans including the economic feasibility of each. The second section deals with the maximization of benefits accruable to the various alternative channel and anchorage dimensions for the selected plan. The third section is an assessment of the social and cultural impacts of the various alternative plans.

SECTION A

ECONOMIC ANALYSIS

Methodology

2. Benefits attributable to each of the alternatives are estimated under the following categories: damages prevented to moored vessels, reduction of lost fishing time, transportation savings, increased lobster catch, increased scallop catch and increased finfish catch. The biological and economic study areas will be described in the base condition. Economic and biological conditions will also be described under "without plan" and "with plan" conditions for each alternative. In addition, the current institutional setting without the plan will be described. The benefits to be estimated are expected net additions to the national economy and are derived from comparison of the "without plan" and "with plan" conditions.

Existing Conditions

3. At the present time, 44 boats are permanently moored at Corea Harbor in the Federal anchorage which comprises 5.5 acres. Nearly all are commercial lobster and/or scallop boats. Most of the boats are 32 to 40 feet long, with the average size being 32.5 feet. Recent years have shown a general trend toward larger inshore lobster boats, predominantly in the 37 to 40 foot class. Approximately 12 percent of the Corea Harbor fishing fleet is now in this larger class and reasonable projections show that 25 percent of the fleet will have converted to this class by 1990. Approximately twelve of the 40 lobster boats in the current fleet fish for scallops an average of 25 days per year. At present no finfishing boats moor in or operate out of Corea Harbor.

4. As stated in the section on Problems, Needs, and Opportunities, there are a number of concerns relating to existing conditions in Corea Harbor. (1) The existing 5-1/2 acre anchorage provides room for about 35 of the 30 to 40 foot lobster boats. However, there are presently 40 of these boats plus four 16 foot skiffs. Consequently during periods of storms with high attendant winds and waves, these boats are driven against

each other causing damage. (ii) The channel leading to the harbor is not sufficiently deep in all areas to enable access to the harbor during periods of low tide. Continued shoaling will result in further time delays and the need to convert to shallower draft, smaller capacity boats. In the case of projected finfishing vessels, delays could result in fish spoilage or quality degradation problems. (iii) A third problem is associated with the bar which extends between the mainland and Bar Island. During times of moderate to heavy seas it is dangerous to enter and leave the harbor via the open sea between the mainland and Western Island. There are no islands or other obstructions to protect boats from high seas coming in from the open Atlantic. During periods of high tide, boats can gain access to Corea Harbor via the safer route, northeast between the mainland (Young's Point) and Bar Island. However, the bar prevents use of this passage for approximately 35 percent of the tidal cycle. (iv) Boats moored in Corea Harbor are often damaged during periods of severe storms with attendant winds from the southerly direction. When the tide is low an existing ledge formation serves as a natural breakwater. At conditions above mid-tide, waves from the open Atlantic roll unhindered into the mooring area causing damage to vessels each year.

Evaluation of Plans

5. In an effort to alleviate the problems stated above and in adherence to the planning objectives plans have been formulated to eliminate, or at least reduce, those disruptive influences to the Corea fishing economy. Benefits which accrue to each structural plan will be estimated and displayed.

Benefits will be evaluated for five structural plans. The main features of each plan are stated below:

PLAN A - Dredge additional acreage for mooring; 1.5 acres to the northeast of the existing 5.5 acre anchorage

PLAN B - Dredge entrance channel to 8 foot depth and varying widths and dredge an additional 1.5 acres of anchorage area south of the existing 5.5 anchorage

PLAN C - Plans A & B Combined

PLAN D - Provide a channel through the sandbar between the mainland and Bar Island

PLAN E - Provide a breakwater at the mouth of the entrance channel.

Economic Analysis - Plan A

6. The main feature of PLAN A is the dredging of additional mooring space in the harbor. A 1.5 acre anchorage, 6 feet deep at MLW, will be

provided to the northeast of the existing anchorage. The existing 5.5 acre anchorage will remain 8 feet deep. The total first cost and annual cost for PLAN A are presented in Table 5-1 below.

Table 5-1
Total First Cost and Annual Cost
Plan A
1980 Price Level - 7-3/8% Interest Rate

First Cost:	
Dredging	\$128,400
Contingencies	19,300
Engineering and Design	10,300
Supervision and Administration	10,300
Total First Cost	<u>\$168,300</u>
Annual Cost:	
Interest and Amortization	\$12,800
Maintenance Dredging	2,400
Total Annual Cost	<u>\$15,200</u>

7. Benefits which accrue to PLAN A are estimated under the following categories: (i) prevention of vessel damage while moored, (ii) reduction of lost productive fishing time due to repairs (iii) increased lobster landings through fleet additions (iv) increased scallop landings through fleet additions.

(1) Prevention of Vessel Damage while Moored

8. There are presently 46 moorings in Corea Harbor, all of which are privately owned. Since the economy of Corea is dependent on lobster fishing it follows that one's lobster boat is an extremely important piece of capital. The Corea harbormaster has pointed out that at present many families consisting of grandfathers, fathers and sons comprise the ownership of the Corea fleet. One reason that the harbor has become so overcrowded relates to the difficulty involved in denying a family member a mooring location alongside his father's or brother's. An audit of the Corea mooring list shows that nearly one-half of the lobster boats are owned by individuals from four families.

9. Presently there are 40 lobster boats permanently moored at Corea Harbor. The average length of these vessels is 32.5 feet. The present 5.5 acre anchorage provides approximately 240,000 square feet of mooring area. The vessels are moored to a single point allowing them to rotate in a circle in response to wind and currents. Because of the tide range of 10.5 feet at Corea Harbor the average vessel requires 2-1/2 times the mooring area at low tide than at high tide since the radius of the mooring area increases from 36.5 to 55 feet. Therefor under optimum conditions each vessel requires 9,500 square feet of mooring area. However at present the 5-1/2 acre anchorage only provides each vessel with approximately 6,000

square feet or 63 percent of optimum. Since not all vessels move in response to wind and currents at the same rate, under the present crowded conditions, they occasionally swing into one another causing chafing damage. These hazardous conditions occur most often during the severe storms, with seas in excess of 10 feet, which occur approximately 10 percent of the time at Corea Harbor.

10. Increasing the available anchorage area allows the moorings to be spaced farther apart, reducing the degree of overlap of adjacent circular mooring areas. The present damages to vessels while moored may be attributed to the 37 percent overlap of areas. Therefore a percentage reduction in overlap area will result in a proportional decrease in damages attributable to overcrowding in the anchorage. As newer, larger boats replace aging boats in the fleet, the overlap area will increase resulting in a proportional increase in damages.

11. This methodology represents an idealized case based upon an average vessel size. In reality local fishermen would arrange moorings on an individual basis according to the length of each boat. This idealized system is used only as a basis for determining percentage reductions in collision damages sustained while boats are moored, and resulting benefits that would be derived from anchorage expansion.

12. Since the mooring capacity of Corea Harbor is strained, the fleet is susceptible to damage from storm conditions with high wind and waves. A dollar value of mooring damage is difficult to estimate due to the differing degrees of damage to different boat components, varying repair costs and differing periods of time to repair. However, a poll of Corea Harbor boat owners resulted in a consensus estimate that, on average, five man-days each year are spent in repairing damage incurred to boats while on the mooring. A reasonable estimate of the value of the repair time was set at \$6.00 per hour. Therefore, each man day is worth \$48.00.

$$\begin{array}{l} \$48/\text{man day} \times \frac{5 \text{ man-days}}{\text{Boat-year}} \times 40 \text{ boats} = \$9,600 \text{ per year} \end{array}$$

13. Under the "without project" condition, the existing condition is not only expected to continue but to exacerbate for the following reasons: (1) there is a trend toward larger boats, (2) replacement parts and repair time are becoming more costly and (3) there will be future pressure by young Corea residents to enter the lobster fishery and participate with their own boats in the Corea economy. Under the "with project" condition the additional mooring space provided will enable the local fishermen to space out the moorings thus eliminating this category of damage and a benefit of \$9,600 annually will be realized.

(ii) Reduction of lost productive fishing time due to repairs

14. In addition to the benefit due to reduced damage, there will be a benefit resulting from a reduction in fishing time lost because of the

damages incurred. It was estimated that of the five days of down time for repairs, two would have been productive fishing days. An estimate of the average catch per day of lobster fishing is 100 lbs. The annual benefit which accrues to the reduction of lost fishing time through damage prevention is estimated by the following computation. Best estimates are that older, fully depreciated boats realize a net return of 70 percent of the catch after expenses.

Catch per boat per day	X	Amount of days	X	Ex-vessel price	X	Number of boats	X	Net Return	=	Annual Benefit
100 lbs	X	2 days	X	\$1.86	X	40	X	.70	=	\$10,400

15. A complete treatment of the lobster resource and fishery is contained in the section to follow. Under the "without project" condition lost fishing days would continue to increase as mooring damages increase. The rationale for this is stated in Plan A (i) above. As damages increase the lobster catch will decrease proportionately causing financial burden to the fishermen and Corea economy as a whole. Under the "with project" condition lost fishing days will be kept to a minimum and the catch previously foregone will be recovered resulting in an estimated annual benefit of \$10,400.

(iii) Increased lobster landings through fleet additions

16. The basis for the increased catch projection is the stable position that both Corea Harbor and Hancock County occupy in the State of Maine lobster fishery. Hancock County landings have accounted for approximately 25 percent of total Maine landings over the period 1968 to 1979.

Table 5-2
LOBSTER LANDINGS
(000's of lbs.)

<u>Year</u>	<u>Hancock County</u>	<u>State of Maine</u>
1968	5,116.9	20,501.7
1969	5,258.6	19,834.8
1970	4,625.6	18,172.3
1971	4,302.3	17,558.4
1972	4,003.7	16,256.5
1973	4,659.7	17,044.2
1974	4,036.9	16,457.6
1975	3,885.2	17,017.4
1976	4,584.2	19,001.1
1977	4,205.0	18,487.1
1978	4,484.5	19,130.5
1979	5,295.6	22,133.2

Source: Current Fisheries Statistics Bulletins: Maine Landings 1968-1979, National Marine Fisheries Service.

17. Historical data for the latest available complete year, 1979, indicate that the price per pound for lobsters landed in Hancock County averages \$1.86/lb. This is an increase of 150 percent over the average ex-vessel price of \$.73/lb. received in 1968.

Table 5-3
LOBSTER LANDINGS AND EX-VESSEL PRICE
HANCOCK COUNTY, MAINE, 1979

<u>1979</u>	<u>Lbs.</u>	<u>Dollars</u>	<u>Price Per Pound</u>
Jan	111,198	\$361,393	\$3.25
Feb	23,275	73,316	3.15
Mar	53,930	179,047	3.32
Apr	86,429	228,420	2.64
May	168,469	340,307	2.02
Jun	192,400	413,700	2.15
Jul	167,427	298,020	1.78
Aug	762,487	1,258,103	1.65
Sep	1,445,866	2,414,596	1.67
Oct	1,135,782	2,123,912	1.87
Nov	685,730	1,206,884	1.76
Dec	462,636	962,282	2.08
TOTAL	5,295,629	\$9,859,980	

Average Price Per Pound for 1979 = \$1.86

Source: National Marine Fisheries Service

18. Statistics for lobster and finfish landings for the State of Maine are published monthly with county landings totals as the lowest level of disaggregation. Reliable port landings are not available due to the variety of outlets through which lobsters are sold ex-vessel and the lack of a required accurate recording system for the individual fisherman. In an effort to ascertain the base economic condition for the Corea lobster industry two sources were employed. The first was the records of the Corea Lobster Co-Op, Inc. This is a well established co-operative organization through which Corea Harbor fishermen have marketed lobsters and scallops since 1970. The present membership of the Co-Op is 44. The total lobster poundage handled by the Corea Co-Op over the past five years is:

<u>Year</u>	<u>Total Lobster Poundage</u>
1975	400,515
1976	365,361
1977	276,745
1978	268,958
1979	343,409

19. However, the above series is not consistent, due to the external influence of an individual lobster buyer who was in business from June 1976 to March 1980 at Corea. This second source of landings data could not be verified, therefore, the following method was used to estimate his handle. Local sources estimate that this individual handled the lobster catch of between 5 to 10 boats. For estimation purposes the number 7 is chosen. This means that of the 40 boat Corea lobster fleet, 33 boats dealt with the Corea Co-Op. During 1979, the total Co-Op handling of 343,409 lbs. distributed among 33 boats results in an average per boat annual catch of 10,400 lbs. Assuming the seven boats that utilized the alternative buyer landed the same amount, an additional 72,800 lbs. of lobster were caught by Corea fishermen. Therefore, the estimated 1979 lobster landings total at Corea Harbor was $(343,409 + 72,800)$ 416,200 lbs. with an ex-vessel value of \$774,000. Based on these numbers, Corea Harbor accounts for eight percent of Hancock County landings and two percent of the State total. Though percentages appear small, the lobster industry is the most vital income source to the residents of the village of Corea.

20. Plan A provides for the dredging of an additional mooring area of 1.5 acres in the northeast section of the harbor. The additional area will be dredged to a depth of 6 feet while the existing anchorage will remain 8 feet deep. Upon project completion existing moorings will be spread out to safe distances to preclude damage during storm and rough conditions. With the relocation of the moorings, there will still be sufficient mooring space for additional vessels. It has been estimated that at least four additional new lobster boats would be added to the Corea Harbor fleet upon project completion. This projection is based upon local sources who relate that entry into the fleet is all but precluded due to overcrowding in the existing anchorage. Entry into the industry is very important in Corea where the population is 270 and the lobster fishery is the mainstay of the local economy.

21. The estimation of the benefit which accrues to the increased lobster catch through the addition of boats is as follows:

22. The biological study area where the Corea fleet fishes for the lobster resource is Gouldsboro Bay to the north and the area to the south and west of Petit Manan Island. During the months of August to October when shedding and migration occur the area fished is from the shore to three miles seaward. During the remaining months the seaward limit is extended to 15 miles. The economic study area is the village of Corea and the town of Gouldsboro. Since all the fishermen are local residents and an infrastructure exists to support the fleet (Co-Op, repair facilities, bait,

fuel, etc.) all impacts from additions to the fleet will primarily affect only this area. The predominant source of income to the Corea economy is from the local lobster fishery and any impacts both positive and negative will be concentrated in this local micro economy. The institutional setting in which Corea lobster fishermen operate is that which exists statewide in Maine. Entry is unlimited, number of traps is unlimited, and only lobster size is managed. The Maine Department of Marine Resources is addressing the issue of lobster management in the State. Any form of potential management is at least one year removed. The latest indication is that the only management tool which might be implemented would be an increase in the legal size of the lobster which could be taken. The current legal size is a 3-3/16" measure from the eye socket back to the rim of its carapace. The increased size has yet to be determined. Indications are that the use of hatcheries and limiting entry to the fishery will not be implemented.

23. The average lobster landings per boat in the Corea fleet for 1979 was estimated at 10,400 lbs. with an ex-vessel value of \$1.86/lb. The total catch of the four new additions to the fleet will total 41,600 lbs. which is a 10 percent increase in total Corea landings. Best estimates of net return to a new boat are roughly 50 percent of the ex-vessel value of landings. The total increase will accrue from new boats, where the per boat annual catch is assumed to equal that of the existing fleet. The annual benefit is estimated to be:

10,400 lbs.	x 4	x	\$1.86/lb.	x	.50	=	\$38,688
per boat			boats				

24. The biological conditions with the plan should remain virtually the same as conditions without the plan. Each local smaller Maine lobster harbor has informally understood lobster fishing grounds associated with it. These grounds have supported the Corea fleet well over the recent past and the projected 10 percent increase is not expected to affect the sustainability of the resource.

25. The Maine Department of Marine Resources (DMR) has no evidence that would indicate that a 10 percent increase in the lobster catch in the Corea area would have an adverse effect on the resource. The 10 percent increase (41,600) equals 0.8 percent of Hancock County landing for 1979 and 0.2 percent of total Maine landings. A change in the institutional setting, i.e., an increase in legal size would have the long term effect of enhancing the resource by giving females extra years to reproduce. Unlimited entry will not affect the Corea fleet due to its small size and the ceiling that the anchorage area would place on fleet growth.

26. The economic setting without the plan would worsen from the present status. No new entry would be possible into the fishery and physical conditions in the harbor would deteriorate further resulting in continuing vessel damage and lost fishing time. A potential lobster catch increase would be foregone and decreases from existing landings could occur. This

would have serious effects on the viability of the local economy. Under the with plan condition the new entry of four boats to the fleet would result in an annual benefit of \$38,700; the existing fleet would be able to maintain present catch levels. The Co-Op would be strengthened through an increased and reliable supply and the local fishery would maintain its competitive edge. Since the additional catch is relatively small it is not expected to have any effect at all on market prices.

(iv) Increased scallop landings due to fleet additions

27. Under current conditions, approximately 12 boats in the Corea fleet have fished for scallops an average of 25 days during each of the past five seasons. The scalloping season begins on 1 November and ends on 15 April. The Corea Lobsterman's Co-Op can handle as many scallops as are landed. Hancock County is a significant contributor to the total scallop landings in Maine, accounting for 40 percent of the 1979 landings.

Table 5-4
SCALLOP LANDINGS, 1979
Hancock County and State of Maine Totals

Vessel	Average Ex-		
	Pounds Landed	Dollar Value	Price Per Pound
Hancock County	468,893	\$1,542,156	\$3.29
State of Maine	1,163,645	\$3,878,413	\$3.33

28. The Corea scalloping effort is more of an ancillary fishery to lobstering as it takes place during times of slack lobster catches when the lobster boat is under-utilized. Best estimates are that a day's catch of scallops averages 50 lbs. The existing fleet will continue to fish for scallops, but the benefit for additional catch would accrue only to the four new lobster boats added to the fleet. It is assumed that all four boats would fish for scallops based on the additional need for revenue to meet the boat financing payments.

29. The benefit to additional scallops is estimated in a manner analogous to the lobster benefit. Under the "with plan" condition each boat would land a projected 50 lbs. of scallops on each of the 25 days of effort. The ex-vessel price is the 1979 average of \$3.29, and net return on a new boat is again assumed to be 50 percent. The benefit is therefore estimated as:

$$4 \text{ boats} \times 50 \text{ lbs. per day} \times 25 \text{ days} \times \$3.29/\text{lb.} \times .50 \text{ net return} = \$8,225$$

30. The biological study area for the scallop resource is Gouldsboro Bay. The Maine Dept. of Marine Resources is of the opinion that current levels of scallop fishing in Gouldsboro Bay are moderate and that this

additional catch by Corea boats will not affect the sustainability of the resource. It is therefore, projected that the biological setting will not change under the "with plan" versus the "without plan" condition. The total additional scallop catch of 5,000 pounds is equal to one percent of total 1979 Hancock County landings and 0.5 percent of total Maine landings.

31. The economic setting without the plan would be unchanged from the present. The same boats would scallop fish during the November to April period. However, future revenue would be foregone from the potential landings of the additional vessel from a resource which is increasing in price and demand. Under the "with plan" condition an additional 5,000 lbs. of scallops would be landed annually. This would result in an annual benefit of \$8,225, thus adding strength to the viable Corea fishing economy and enhancing the position of the Corea Co-Op and the fleet. The relatively small amount of the increased scallops catch is not expected to affect the market price of the resources.

Table 5-5
Summary of Annual Benefits - Plan A

<u>Benefit</u>	<u>Dollar Value</u>
(i) Prevention of Vessel Damages while Moored	\$9,600
(ii) Reduction of Lost Fishing Time	10,400
(iii) Increased Lobster Landings	38,700
(iv) Increased Scallop Landings	8,200
TOTAL	<u>\$66,900</u>
 TOTAL ANNUAL COST - PLAN A	 \$ 15,200
Benefit-to-Cost Ratio - PLAN A =	4.4 to 1

Economic Analysis - Plan B

PLAN B:

32. The main features of Plan B are: (1) to dredge areas and remove ledge within the entrance channel to provide a uniform depth of eight feet and width of 100 feet for the entire 2,500-foot channel length and (2) to provide a 1.5 acre anchorage, six feet in depth, to the south of the existing 5.5 acre anchorage. The total first cost and annual cost for PLAN B are presented in Table 5-6 below.

Table 5-6
TOTAL FIRST COST AND ANNUAL COST
PLAN B
1980 PRICE LEVEL - 7-3/8% Interest Rate

First Cost:		
Dredging		\$441,600
Contingencies		66,200
Engineering and Design		35,300
Supervision and Administration		35,300
Aids to Navigation		4,000
	Total First Cost	\$582,400
Annual Cost:		
Interest and Amortization		\$44,200
Maintenance Dredging		2,600
Maintenance of Aid to Naivation		1,000
	Total Annual Cost	\$47,800

33. The benefits which are estimated under Plan B are (i) transportation savings to the existing fleet and (ii) additional fish landings of the projected future fleet.

(i) Transportation Savings

34. At present, the channel leading to the harbor is not sufficiently deep in all areas to enable access to the harbor at low tide. In addition, a ledge outcropping directly across from the Corea Co-Op unloading dock, extends into the harbor making safe navigation difficult and time consuming. Thirdly, when a boat is offloading at the Co-Op dock, safe two-way vessel traffic in the channel is not possible due to reduced channel width. The combined effect of these three factors results in delays for Corea lobster boats entering and exiting the harbor. For the most part the larger boats which are 37 to 40 feet long are most affected by these delays due to their lengths, beams and deeper drafts. There are presently 12 of these boats in the Corea fleet and due to their size and efficiency this type of boat is the most probable future replacement boat.

35. Under the "with plan" condition the above mentioned detriments to safe and timely navigation would be eliminated. The benefit to transportation savings with the plan was estimated as follows. On the average, an estimate of one hour per day saved per each of the twelve boats was utilized as a measure of transportation savings.

36. Operating cost per hour per boat was estimated to be \$10.00 with crew and fuel being the major components. The total annual benefit is calculated as:

$$\begin{array}{rclclclclcl}
 1 \text{ hour per} & \times & \$10/\text{hr.} & \times & 12 & \times & 250 \text{ fishing} & = & \$30,000 \\
 \text{day saved} & & \text{operating} & & \text{boats} & & \text{days per} & & \\
 & & \text{cost} & & & & \text{year} & &
 \end{array}$$

(11) Additional fish landings of the projected future fleet

37. Under the existing "without project" condition or with Plan A alone, conditions do not permit the establishment of finfishing at Corea Harbor. However, under the features provided in Plan B, mooring space would be provided for finfishing boats in the 1.5 acre anchorage to the south and safe channel navigation would be possible. The design vessel for the future finfishing fleet is a 55-foot vessel. The 8 foot deep, 100 foot wide channel would permit safe navigation through the elimination of delays and hazards and allow the timely offloading of the catch. These 55-foot finfish boats require at least 8 feet of water in all channel areas as they draw from 6.5 to 7 feet of water when loaded. The derivation of the finfish benefit is as follows.

38. As previously mentioned, the predominant resource landed at Corea is lobster with scallops being a secondary fishery during the slack time of the year for lobsters. General background for the finfish projections is contained in Hancock County and State of Maine finfish landings. The table below indicates that over the period 1975 to 1979, total Maine finfish landings have nearly doubled (+96%) and the value of the catch has increased by nearly 250 percent.

Table 5-7
State of Maine - Total Finfish Landings and Value
1975-1979

	<u>Total lbs.</u>	<u>Value</u>
1975	100,661,326	\$ 7,304,538
1976	141,768,659	12,529,434
1977	148,302,187	16,422,822
1978	157,504,865	22,054,714
1979	197,080,599	25,382,734

39. At present, there is no finfishery at Corea, but numbers are available for Hancock County. Slightly over 20 million pounds of finfish were landed in Hancock County during 1979 which equals roughly 10 percent of State landings. However, 89 percent of the Hancock landings were Sea Herring and Alewives. The closest port with substantial finfish landings is Rockland Harbor in Knox County which is about 60 miles southwest. Knox County landings showed evidence of quantities of cod, flounder, haddock, white hake and pollock. These species are growing in demand and value and are the same species that the Maine Department of Marine Resource projects would be landed at Corea.

40. Because of increasing market opportunities for finfish, local Corea fishermen and the Maine Department of Marine Resources have projected, that under the "with plan" condition, from two to five boats in the 55-foot class would be added to the Corea fleet. A local boatyard in

Corea currently has a design for this size and type of boat which would facilitate establishment of the fishery. The Co-Op would probably handle the finfish which would be trucked to the markets. Maine DMR has reason to believe that a regional fish processing center may be established within the next few years, perhaps within the Ellsworth area.

41. Under the "with plan" condition the additional 1.5 acre anchorage area will open up space for new finfish vessels. For purposes of the benefit analysis, and to be conservative since the finfishery will be new, two boats are expected to be added to the Corea fleet. Maine DMR projects that the predominant species to be landed will be cod, gray sole, haddock, white hake and pollock. Since these species will be landed in differing amounts and at different prices an average value, based on 1979 prices, of \$.20 per pound has been established. Each of the two boats will have a capacity of 10,000 lbs and is expected to fill up twice per month. Total landings of the two boats of the above mentioned species are therefore projected to be 480,000 lbs annually. Utilizing the projected ex-vessel price of \$.20 per lb. and the net return factor of 50 percent, the benefit is computed as follows:

2	X	240,000 lbs	X	.20	X	.50	=	\$48,000
new fin-		annual		average		net		
fish boats		catch		price/lb.		return		

42. The biological study area for the Corea finfish effort would be essentially the offshore waters seaward of Corea. The projected catch would be so small relative to 1979 total state landings for these species (0.8%) that the Maine DMR feels that these would have no impact on the existing resources from the Corea effort. The biological study area would therefore remain the same under both the "without plan" and "with plan" conditions. The institutional setting in Maine involves unlimited entry for finfishing and catch quotas administered by the National Marine Fisheries Service in conjunction with the 200 mile limit law. Unlimited entry should not affect the Corea finfishery as relatively little finfishing now is done north of Knox County and there is a physical constraint on Corea fleet expansion. The quota system is designed with the future sustainability of the resource in mind, therefore it is a beneficial setting for the future of the fishery.

43. Under the "without plan" condition there will not be the establishment of a finfishery at Corea Harbor. Lobster fishing will be the main activity and further problems will be encountered due to the over-crowded conditions. Under the "with plan" condition, additional mooring space will become available at Corea which will enable a finfishing effort to be established. The annual benefit from the two finfish boats has been projected to be \$48,000. This benefit estimate is conservative since estimates of up to five boats have been made (Maine DMR) and the average price per pound could easily rise above \$.20/lb. in the near future. The addition of a finfishery at Corea will strengthen the local economy through diversity of resources, employment opportunities and increased local economic activity in support related endeavors.

Table 5-8
Summary of Annual Benefits - Plan B

<u>Benefit</u>	<u>Dollar Value</u>
(i) Transportation Savings	\$30,000
(ii) Future Finfish Landings	\$48,000
Total Annual Benefits	<u>\$78,000</u>
Annual Cost Plan B	\$47,800
Benefit-to-Cost Ratio Plan B	1.63 to 1

44. In the preceding analysis for Plan B, the two finfish boats will occupy approximately one-half of the additional 1.5 acre anchorage to the south. However, the plan is economically justified and the remaining one-half of the anchorage would be used as follows. Additional finfish vessels could utilize the area and/or larger size replacement boats for the existing lobster fleet could be accommodated without crowding.

Economic Analysis - Plan C

PLAN C

45. Plan C simply stated combines the main features of Plan A and Plan B. Since each plan is economically justified, it follows that the present and future needs of the Corea fleet and the Corea economy can best be served by implementing both plans. The main features of the combined plan include 3 additional acres of mooring space (1.5 acres to the northeast and 1.5 acres to the south) and an entrance channel of uniform 100' width and 8' depth.

Table 5-9
TOTAL FIRST COST AND ANNUAL COST
PLAN C
1980 Price Level - 7-3/8% Interest Rate

First Cost:	
Dredging	\$517,500
Contingencies	77,600
Engineering and Design	41,400
Supervision and Administration	41,400
Aids to Navigation	<u>4,000</u>
Total First Cost	\$681,900
Annual Cost:	
Interest and Amortization	\$51,800
Maintenance Dredging	3,800
Maintenance of Aids to Navigation	<u>1,000</u>
Total Annual Cost	\$56,600

46. The benefits which accrue to Plan C are those which were previously discussed under Plans A and B. The increased anchorage area to the northeast provided by Plan A would permit the existing fleet to spread out, therefore, simultaneously reducing vessel damage and increasing productive fishing time. In addition, the added space would enable additions to the fleet which would result in increased lobster and scallop landings. The provisions of a channel of uniform width (100') and depth (8') would result in the elimination of delays to the existing fleet thereby securing a transportation savings. The channel and additional anchorage to the south would also provide for the establishment of a finfishing industry at Corea. The value of the finfish landings would be a benefit to the Corea economy and the national economy. Finally, the channel would provide for safe two-way vessel passage at MLW without presenting a hazard to vessels tied up at the Co-op dock offloading catches. As stated in the discussion of Plan B only one-half of the 1.5 acre anchorage to the south is projected to be utilized upon project completion. The remaining .75 acre area is projected to be utilized in the future in some combination of the following: (1) accommodate additional finfish vessels, (2) accommodate larger replacement vessels in the existing fleet without overcrowding, (3) provide space for transient vessels and (4) provide space for utilization as a harbor of refuge. The summary of benefits which accrue to PLAN C are found below.

Table 5-10
Summary of Annual Benefits - Plan C

<u>Benefit</u>	<u>Dollar Value</u>
(i) Prevention of Vessel Damages While Moored	\$ 9,600
(ii) Reduction of Lost Fishing Time	10,400
(iii) Increased Lobster Landings	38,700
(iv) Increased Scallop Landings	8,200
(v) Transportation Savings	30,000
(vi) Future Finfishing Landings	48,000
Total Annual Benefits	<u>\$144,900</u>
Annual Cost - Plan C	\$56,600
Benefit-to-Cost Ratio - Plan C	2.6 to 1

Economic Analysis - Plan D

PLAN D:

47. The main feature of Plan D is to provide a channel through the bar between the mainland at Young's Point and Bar Island. As stated in the Problem Identification section (Appendix 1), passage over this bar provides a safer route to and from the harbor during periods of high winds and waves. Entering and leaving the harbor via the open sea between the mainland and Western Island is more dangerous due to the lack of islands or other obstructions to protect the boats from the high seas rolling in from the open Atlantic. The total first cost and annual cost for Plan D are exhibited below:

Table 5-11
TOTAL FIRST COST AND ANNUAL COST
PLAN D
 1980 PRICE LEVEL - 7-3/8% INTEREST RATE

First Cost:

Dredging	\$239,600
Contingencies	35,900
Engineering and Design	19,200
Supervision and Administration	19,200
Aids to Navigation	10,000
Total First Cost	<u>\$323,900</u>

Annual Cost:

Interest and Amortization	\$24,600
Maintenance Dredging	1,900
Maintenance of Aids to Navigation	2,000
Total Annual Cost	<u>\$28,500</u>

48. Benefits which accrue to Plan D are estimated under two categories. (i) the transportation savings to those fishing boats that would use the channel exclusively and (ii) additional scallop fishing time.

(i) Transportation Savings

49. It is estimated that under the "with plan" condition with the channel in place through the bar, approximately 25 of the Corea lobster boats would utilize the channel exclusively. These boats would be the ones that fish in and near Gouldsboro Bay. Under the "without plan" condition the boats must make the 3-mile trip around Outer Bay Island and Sheep Island due to the sandbar and poor tidal conditions. At higher stages of the tide when the bar area may be safely navigated, the distance from Corea Harbor to the fishing grounds in Gouldsboro Bay is reduced to one mile. At present, vessels may safely cross the bar area 65 percent of the time. With the channel they may safely cross at all stages of the tide and would thereby save two miles of running time per trip or four miles per day for the 35 percent of the time that passage is at present impossible. With a 200 day fishing season, 25 boats, and 4 miles per day saved 35 percent of the time, then, annually, 7,000 boat-miles would be saved. Assuming an average running speed of 10 miles per hour, 700 hours per year would be saved. At a rate of 4 gallons of fuel burned per hour this equals 2,800 gallons of fuel saved. Priced at \$1.20 per gallon fuel savings would be \$3,360 annually.

(ii) Increased Scallop Catch

50. Currently, approximately 12 full time and part time Corea based boats fish for scallops about 25 days per year. Their combined total scalloping time is equivalent to 8 full time boats. The season begins on

November 1 and ends on April 15. The biological resource area for scallops is Gouldsboro Bay, therefore the channel through the bar would facilitate passage of the scallopers to the area. It cannot be said with certainty what the final impact of the channel will be on the scallop fishing effort of the Corea fleet. However, since the percent effort, 25 days, is not very intensive, it is assumed that other factors, especially weather, contribute greatly to the low number of fishing days. It is therefore, assumed that the channel or "with plan" condition would provide one half as many additional fishing days as exist at present. This amounts to 12 additional days. With average landings per boat per trip set at 50 lbs, ex-vessel price \$3.29, and net return 70 percent for an existing boat, the benefit is calculated as follows for 8 Corea boats.

8	X	12	X	50 lbs	X	\$3.29	X	.70	=	\$11,100
additional		boats		catch		ex-vessel		net		
days				per day		price		return		

51. Although tangible benefits would accrue to the channel through the Bar Island thoroughfare, the project is not economically justified due to the amount of first cost and annual cost. This cost stems from the composition of the bar. Much blasting and dredging of rock would be required at \$110.00 per cubic yard. Therefore, the annual project cost is greater than the annual benefits resulting in a negative benefit-to-cost ratio.

Table 5-12
Summary of Annual Benefits - Plan D

<u>Benefit</u>		<u>Dollar Cost</u>
(1)	Transportation Savings	\$ 3,400
(11)	Increased Scallop Landings	\$11,100
	Total Annual Benefits	\$14,500
	Total Annual Cost - Plan D	\$28,500
	Benefit to Cost Ratio - Plan D	.5 to 1

Economic Analysis - PLAN E

PLAN E

52. The main feature of Plan E is to construct a breakwater at the channel entrance to Corea Harbor. Construction of this breakwater will address the problem of damage to boats moored in the harbor during periods of severe storms with attendant winds from the southerly direction. When the tide is low, two existing ledge formations serve as a natural breakwater. At conditions above mid-tide, waves from the open Atlantic roll in causing damage each year. The total first cost and annual cost for the breakwater are presented below:

Table 5-13
Total First Cost and Annual Cost
Plan E
1980 Price Level - 7-3/8% Interest Rate

First Cost:

Breakwater Construction	\$245,400
Contingencies	36,800
Engineering and Design	19,600
Supervision and Administration	19,600
Aids to Navigation	1,000
Total First Cost	<u>\$322,400</u>

Annual Cost:

Interest and Amortization	\$24,500
Maintenance of Breakwater	3,800
Total Annual Cost	<u>\$28,300</u>

53. Benefits which accrue to Plan E are estimated under the categories of (i) damages prevented to vessels while moored and (ii) reduction of lost fishing time. Essentially this alternative plan i.e. the breakwater, addresses the same problem as Plan A which is the larger anchorage. Damage sustained by boats while moored during storm conditions can be prevented either by breaking and reducing waves as they enter the harbor from the south, or by spacing the boats farther apart to facilitate riding out the waves without collisions.

54. Benefits estimated for the breakwater are therefore identical to those estimated for Plan A under the categories of damages prevented and reduction of lost fishing time. Derivation of these benefits can be found under the discussion for Plan A.

Table 5-14
Summary of Annual Benefits - Plan E

<u>Benefit</u>	<u>Dollar Amount</u>
(i) Prevention of Vessel Damages while Moored	\$9,600
(ii) Reduction of Lost Fishing Time	10,400
TOTAL	<u>\$20,000</u>
Total Annual Cost - Plan E	28,300
Benefit-to-Cost Ratio - Plan E	.7 to 1

55. The above benefit-to-cost ratio demonstrates that the Breakwater Plan for Corea Harbor is not economically justified at this time.

Summary of Benefits

Table 5-15 below summarized the benefits which accrue to each plan.

Table 5-15
Summary of Project Benefits
Corea Harbor

	<u>PLANS</u>				
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Prevention of Vessel Damage at Mooring	\$9,600	--	\$9,600	--	\$9,600
Reduction of Lost Fishing Time	10,400	--	10,400	--	10,400
Increased Lobster Landings	38,700	--	38,700	--	--
Increased Scallop Landings	8,200	--	8,200	11,100	--
Increased Finfish Landings	--	48,000	48,000	--	--
Transportation Savings	--	30,000	30,000	3,400	--
TOTAL	\$66,900	\$78,000	\$144,900	\$14,500	\$20,000

Summary of Economic Analysis

56. The Table below summarizes the economic justification of each alternative plan. Since more than one plan is justified, net benefits have been calculated to ascertain the greatest contributor to national economic development.

Table 5-16
Summary of Economic Analysis

	<u>PLANS</u>				
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Annual Benefits	\$66,900	\$78,000	\$144,900	\$14,500	\$20,000
Annual Costs	15,200	47,800	56,600	28,500	28,300
Benefit-to-Cost Ratio	4.4 to 1	1.63 to 1	2.6 to 1	.5 to 1	.7 to 1
Net Benefits	\$51,700	\$30,200	\$88,300	0	0

Conclusion

57. The plan which best serves the present and future needs of the Corea fishing fleet and contributes the greatest to national economic development is Plan C. The analysis to follow examines various project dimensions in an effort to maximize net benefits to Plan C.

SECTION B

OPTIMIZATION OF PROJECT DIMENSIONS AND MAXIMIZATION OF NET BENEFITS PLAN C

1. The recommended plan for navigation improvements at Corea Harbor is Plan C. Since each component (Plan A and Plan B) is incrementally justified, one final step remains in the area of economic analysis; namely, the dimensions of the channel and two anchorages that would maximize net benefits must be chosen. Net benefits are the excess benefits that remain after total annual costs of a plan are subtracted from total annual benefits. The scheme that maximizes net benefits, therefore, causes the greatest contribution to the national economy.

2. The existing channel leading to the Corea Harbor anchorage measures roughly 200 feet across at the ocean entrance and 100 feet at the entrance to the anchorage. Between the termini the channel varies in depth gradually decreasing to a minimum of 5 feet at MLW at the Co-Op dock across from the rock outcropping on the left bank. This situation precludes channel navigation of all traffic at low water. In addition, navigation is difficult and dangerous at tidal ranges preceding and following low tide due to the requirement of passing near or over the ledge in the vicinity of the outcropping.

3. Channel widths of 60, 80 and 100 feet will be analyzed at the existing depth of 8 feet MLW and at a depth of 10 feet MLW. A 6 foot channel depth will not be examined as the existing depth is 8 feet. Anchorage depths of 4 feet, 6 feet, and 8 feet will be examined.

4. The standard formula for estimating the channel width necessary for the safe two-way passage of vessel traffic is five times the beam of the design vessel. This minimum measure allows for a beam's distance between passing vessels and each channel bank. The design vessel for the Corea study is a 55-foot finfish vessel with a beam of 16 feet. This type of vessel is expected to operate out of Corea harbor only under the "with project" condition. The boats in the existing fleet which encounter delays and navigational difficulties due to inadequate channel widths are the 32-foot to 40-foot lobster boats. These vessels vary in beam from 12 to 14 feet, however, 14 feet will be used for analysis since the occurrence of two 14-foot beam vessels passing in the channel is quite likely. Additional channel width is required at Corea to allow for the beam of the boat unloading at the Co-Op dock, while still allowing safe two-way passage.

5. In order to minimize the amount of rock removal necessary to construct the channel, the channel alignment must be as far towards the eastern shore as possible. This necessitates an alignment which includes the off-loading area at the Co-Op dock within the Federal channel limits.

60-Foot Channel Width

6. This width is not sufficient to allow safe two-way passage of vessel from both the existing and future fleets. With a vessel tied up at the Co-Op dock, only 46 feet of channel is available. Based on the formula, only safe one-way traffic is possible. This configuration does not alleviate the delay problems, as discussed under Plan B, and does not provide the physical conditions required for introduction of the larger finfish vessels at Corea. Therefore, no benefits accrue to the 60-foot channel width plan.

80-Foot Channel Width

7. The 80-foot width would just be adequate to allow two-way passage for the largest boats in the existing fleet with a boat tied up at the Co-Op dock. Five times the beam of the largest existing vessel is 70 feet. An additional 14 feet for the docked vessel is added to the 70 feet which equals 84 feet. Therefore, an 80-foot wide channel would just barely suffice for the needs of the existing fleet and a transportation savings of \$30,000 annually, as discussed under Plan B, would result. However, this width would not allow for inclusion of the larger finfishing boats, therefore, no future benefits would be realized.

100-Foot Channel Width

8. A channel width of 100-feet would eliminate delays and provide transportation savings to the existing fleet. In addition, it would allow safe two-way passage for the design vessel with the 16-foot beam. Using the formula (5×16) requires 80 feet for safe two-way passage. Adding 16 feet for a docked vessel at the Co-Op results in a width requirement of 96 feet. The 100-foot channel satisfies these needed measures. Benefits of \$30,000 for transportation savings and \$48,000 for finfish landings total \$78,000 for the 100-foot plan. Since the breakwater plan is not economically justified, the harbor and channel will remain exposed to high winds and heavy seas. Therefore as vessels utilize the channel under adverse weather conditions, the attendant lack of maneuverability necessitates the adoption of a 100-foot wide channel for the entire channel length.

Channel Depth

9. The larger boats in the existing fleet draw roughly 4 to 4.5 feet when loaded. The 55-foot finfish boat would draw 6.5 to 7 feet. Therefore, a uniform channel depth of 8 feet MLW would satisfy the needs of the present and future vessels in the Corea fleet. A depth of 10 feet MLW in the channel would accomplish the same ends as the 8-foot depth, but the added cost would cause a decrease in net benefits. An 8-foot channel depth is, therefore, the measure that achieves economic optimality. Since the existing channel depth is 8 feet at MLW, shallower depths were not considered for analysis.

Anchorage Depth

10. The depth of the existing 5.5 acre anchorage at Corea Harbor is 8 feet at mean low water. The two additional planned anchorages (1.5 acres to the south and 1.5 acres to the northeast) will be examined for depths of 4, 6 and 8 feet at MLW. The larger boats in the existing fleet draw roughly 3 to 3.5 unloaded. It is assumed that all boats will be unloaded while moored in the anchorage. The 55-foot finfish vessels draws approximately 5 feet unloaded. An anchorage depth of 4 feet is acceptable to neither the existing nor the future vessels. The finfish boats would be precluded from mooring due to insufficient depth. The existing fleet would sustain damage to hull bottoms, rudders and propellers as the 4 foot depth would not allow sufficient room for the pitching and rolling of the boats due to wave action in the harbor. It should be noted that since the breakwater plan (Plan E) is not economically justified, then the additional anchorages must be of sufficient area and depth to compensate for continued wave action in the mooring areas. An anchorage depth of 6 feet would allow adequate room for pitching and rolling of both the existing and future fleets. Additional flexibility in mooring plans is available at Corea due to the existing 5.5 acres, 8-foot deep anchorage. The larger deeper draft vessels could be moored in the 8-foot channel while the smaller shallower draft boats could be placed in the additional 6-foot deep anchorages. An anchorage depth of 8 feet in the new areas would accomplish the same features as the 6-foot depth, however, the added cost would cause a decrease in net benefits, thus reducing economic efficiency.

11. The following table displays all combinations of channel and anchorage dimensions previously discussed. While benefits accrue to each plan, only one combination maximizes net benefits in an economically efficient manner. This combination is the 100-foot wide, 8-foot deep entrance channel with two 6-foot deep anchorages. While other combinations also accrue \$144,900 in annual benefits this plan does so at the lowest annual cost, (\$56,600), and therefore, maximizes net benefits at \$88,300.

12. Based on the data displayed in Table 5-17 the recommended plan for navigation improvements at Corea Harbor is Plan C with the 100-foot wide, 8-foot deep channel and one 1.5 acre, 6-foot deep anchorage to the south and one of identical dimensions to the northeast of the existing anchorage.

Table 5-17

Corea Harbor
Net Benefits Which Will Accrue to Possible Combinations
of Plan C Features

	<u>60' x 8' Channel</u>		<u>80' x 8' Channel</u>		<u>100' x 8' Channel</u>		<u>100' x 10' Channel</u>	
	<u>2/6' Anch</u>	<u>2/8' Anch</u>	<u>2/6' Anch</u>	<u>2/8' Anch</u>	<u>2/6' Anch</u>	<u>2/8' Anch</u>	<u>2/6' Anch</u>	<u>2/8' Anch</u>
<u>Benefits</u>								
Prev. of Vessel Dam	\$ 9,600	\$ 9,600	\$ 9,600	\$ 9,600	\$ 9,600	\$ 9,600	\$ 9,600	\$ 9,600
Red. of Lost Fish Time	10,400	10,400	10,400	10,400	10,400	10,400	10,400	10,400
Incr. Lobster Landings	38,700	38,700	38,700	38,700	38,700	38,700	38,700	38,700
Incr. Scallop Landings	8,200	8,200	8,200	8,200	8,200	8,200	8,200	8,200
Incr. Finfish Landings	-	-	-	-	48,000	48,000	48,000	48,000
Trans. Savings	-	-	30,000	30,000	30,000	30,000	30,000	30,000
TOTAL ANNUAL BENEFITS	\$66,900	\$66,900	\$96,900	\$96,900	\$144,900	\$144,900	\$144,900	\$144,900
TOTAL ANNUAL COST	\$30,900	\$46,600	\$40,800	\$55,200	\$56,600	\$69,300	\$82,000	\$94,700
BENEFIT/COST RATIO	2.2 to 1	1.4 to 1	2.4 to 1	1.8 to 1	2.6 to 1	2.1 to 1	1.8 to 1	1.5 to 1
NET BENEFITS	\$36,000	\$20,300	\$56,100	\$41,700	\$88,300	\$75,600	\$62,900	\$50,200

SOCIAL IMPACTS AND ANALYSIS

Description of Alternatives

13. Alternative plans for navigation improvements in Corea Harbor are being considered. The following plans include four activities whose contributions will be examined for an overall scheme of improvement.

Plan A: Dredge northeast anchorage, an area approximately 1.5 acres for additional mooring

Plan B: Dredge additional 1.5 acres in south anchorage and areas within the entrance channel to provide uniform depths and widths for its entire length.

Plan C: Plans A and B combined.

Plan D: Provide a channel through the Bar Island thoroughfare.

Plan E: Provide a breakwater at the mouth of the harbor extending from the west coast.

All plans are described in greater detail in Appendix 2.

Impacts During Construction

14. Impacts common among the structural plans would be felt in the harbor area during the construction phase. These impacts, related to the actual construction activities, include increased air pollutants, noise and dust levels, temporary employment, and road and harbor traffic.

15. Specifications of each plan would indicate types, amounts, and potential sources of construction materials, length of the construction period, and size of temporary work force. These items provide a basis for defining the magnitude of a plan's impacts during construction. Construction related effects generally are short term and site specific.

16. The construction period would not exceed three months for any of the plans. Ten to 30 people would be temporarily employed as a direct result of project implementation.

17. Dredging and disposal operations would be similar for Plans A, B, C and D. Dredging would be performed by a bucket dredge. Two barges would be utilized; one loaded with the dredging equipment and another loaded with dredged material. The presence of barges would hinder normal traffic flow within the harbor area. This increase in harbor vessels would temporarily increase the safety hazards and accident risks faced by boaters. Each plan, however, would obviously affect different areas in the harbor.

18. Plan C is expected to have a greater effect than the other alternatives on the local area and the harbor since it requires more extensive work. The rock formation to be removed as a part of this plan would require blasting in addition to dredging operations.

19. Disposal of the dredged material is discussed in the environmental section of the report. Again, the impacts of this activity would be similar for all of the plans with the exception of Plan E. Since ocean disposal is likely, impacts would be restricted to the movement of materials from the harbor to the ocean site. Disposal at the selected site would not interfere with fishing activities.

20. Plan E is discussed separately here, because the construction activities required under this plan differ significantly from the other plans. The length of construction and increase in temporary employment would fall in the range of two to three months and 10 to 15 employed.

21. Unlike the other plans, Plan E's construction activities are land based. They require the construction of a temporary road for access to the waterfront. Construction materials for the breakwater would be trucked to the adjacent land site, resulting in increased noise and dust levels, air pollutants, and heavy truck traffic on local roads which are unaccustomed to handle large trucks or heavy volumes of traffic. This would increase the safety hazard to local residents who live along the access routes. Some activities would be sea based and like the other alternatives would hinder usual harbor travel and activities.

Impacts During Post-Construction

22. The alternatives described heretofore were formulated in response to two major problems experienced by the Corea Harbor fishing fleet. The first problem is the overcrowding of boats in the anchorage. Overcrowding has resulted in frequent damage to boats, which are moored so close together that they collide during storms. The overcrowded situation has limited the potential for expansion of the fleet. The second problem is the existence of a rock formation and inconsistent depths and widths which obstruct navigation in the entrance channel. This has resulted in tidal delays and presents a safety threat to navigation during low water.

23. A third problem in the harbor is the thoroughfare extending between the mainland, at Young's Point, and Bar Island. The passage between Young's Point and Bar Island provides a safer route when passage between the harbor and open sea is threatened by moderate to heavy seas. This passage is a more direct route for scallopers going to Gouldsboro Bay and lobstermen wanting to reach ocean waters east of Corea. However, the thoroughfare prohibits use of this passage at all times except within two hours of mean high water.

24. Impacts of the structural plans during post-construction can be identified as they relate to the problems identified above. Post-construction impacts generally are long term and can have both site specific and regional implications. Social and economic issues addressed in this section not only include the particular output of the plan (e.g., increased anchorage, improved navigability) but also describe the impacts of these outputs on the town and region.

No Federal Improvement Option

25. With no additional anchorage space, the harbor would continue to be utilized below its potential capacity. Overcrowded conditions would persist for a time with collision damages continuing. Although eventual relocation of some vessels may reduce the damages, replacement with larger vessels could sustain the overcrowded condition.

26. The poor channel conditions would continue to threaten safe navigation. Two way traffic would not be accommodated. Tidal navigation would be required with use of larger vessels, increasing lost fishing time and reducing landings. The desired development of a finfishing industry would not occur.

27. Therefore, a smaller fishing craft becomes more impractical to operate, fishermen would invest in and relocate larger craft. The loss of the fleet would threaten the economic viability of the harbor as it loses its relative attractiveness to surrounding ports. It is anticipated that the Co-op would eventually be phased out. Although population trends are expected to show continuing growth, it is likely that this growth will continue to be an older population retiring in Gouldsboro.

Assessment of Alternatives

Plan A

28. Plan A responds to the problems of overcrowding in the anchorage, providing for an additional 1.5 acres to the existing anchorage. Increasing the anchorage would permit more mooring space per vessel, preventing collisions and subsequent damages. Preventing vessel damage would indirectly increase productive fishing time by eliminating time needed to make repairs. The enlarged anchorage would allow an increased fleet size which ultimately would increase the lobster and scallop landings. The dollar values assigned to these benefits are presented in Appendix 4.

29. Plan A complements local needs and desires by permitting the use of larger vessels as well as new vessels. More efficient utilization of the harbor encourages continued investment, enhancing the economic viability of Corea. Without the threat of collisions, families and individual boat owners wishing to purchase larger boats would now be willing to make the investment.

Plan B

30. Plan B responds to the navigation problems by the inconsistent depths and widths of the entrance channel as well as the overcrowded situation. This plan provides for a uniform depth and width for the entire length of the channel. This would allow for safe navigation of two-way vessel traffic during all tidal periods. Delays created by waiting for the passage of oncoming traffic would be eliminated. Off-loading at the co-op dock would no longer pose the safety problem it currently does with this navigation situation. Additional anchorage, totaling 1.5 acres would be provided in the southern portion of the existing anchorage.

31. Plan B would enhance the harbor's capability to handle finfish. Finfishing vessels generally are larger with greater draft than the lobster boats. Their use of the harbor or co-op facilities is restricted by the tides because of the inconsistent depths in the channel; a problem eliminated by this plan. The increased anchorage would provide similar benefits as those described under Plan A.

Plan C

32. Plan C combines Plans A and B. Therefore, implementation of Plan C would yield the results of both Plans A and B. These results would include an increased anchorage, approximately three acres, and safe and continual access in the channel.

Plan D

33. Plan D responds to the problems associated with limited access between Young's Point and Bar Island. Dredging the thoroughfare would allow for the use of this passage at all times. Time and money would be saved by fishing boats utilizing this passage to reach eastern waters, rather than making the trip around the Western Island. Passage over the thoroughfare is currently sought during periods of rough seas at ocean entry. This plan would permit those boats utilizing this passage to extend their fishing day, which is halved by the tidal situation. Total fishing days would increase. This passage provides a safer access route to Gouldsboro Bay and eastern ocean waters during periods of rough seas.

34. Bar Island is used recreationally by sunbathers, picnickers, and hikers. The thoroughfare has provided a means of access to the island, although most visitors travel by boat. Removal of the thoroughfare would eliminate access to the island by foot. The thoroughfare offers limited accessibility, however, because of the tides.

Plan E

35. Plan E, construction of a breakwater, responds to the problem of boat damages resulting from collisions during rough seas above mid-tide. During lower tides, protection is offered by a natural ledge. The placement of a breakwater at the entrance channel would prevent damages to fishing vessels. In turn, this would increase the fishing time by eliminating the need of boat repairs due to collisions.

Social Well-Being Contributions

Effects on Health, Safety, Community Well-Being

36. The project alternatives would have both adverse and beneficial effects on the health, safety, and community well-being of Corea Harbor. Adverse effects would be temporary and occur during the construction phase. The presence of barges and the movement of construction materials within the project area would be an additional health and safety risk to harbor users.

37. Different locales would be effected by the alternatives. It would appear that the most disruptive activity would be dredging the channel, which is required with both Plans B and C, since all craft utilize the channel. During this activity two barges would be positioned side-by-side, one transporting the dredge and the other being loaded with dredged materials. Blasting activities would also occur. These would be restricted to times of minimal harbor use and would temporarily limit channel use. The dredging operation would also increase the safety hazards and accident risk during its presence in the harbor. Nevertheless, the fishermen would gladly accept the temporary inconveniences for the needed improvements.

38. Plan E, construction of a breakwater, would also restrict normal channel use. Since some of this activity would be land based, it is not expected to cause as much interference as dredging the channel. Land based activities required by this plan would cause some disruption to traffic on local roads in the village of Corea as well. Plans A, B, and C would cause disruption within the anchorage areas. Because areas where no boats are moored would be dredged, interference would be minimal.

39. The long term effects of the structural plans are generally positive contributions to the health, safety, and community well-being of Corea Harbor. These contributions have been discussed in the assessment portions of Appendix 2 and are as follows. Plan A, B and C would contribute to the need for increased mooring space and the desire of fishermen to utilize larger craft. The plans would also reduce economic damages to boats which collide because they are moored too close together. This would eliminate the time devoted to make repairs, increasing fishing time. Over the long term, Plans B and C would provide for safer navigation of the entrance channel, also eliminating tidal delays. Plan D would

make the passage between Young's Point and Bar Island navigable at all times, rather than the current two hours within mean high water. Dredging the thoroughfare offers a safer passage to Gouldsboro Bay and to eastern ocean waters. This passage would be used by scallopers who would no longer be restricted to passage during high tides, increasing their fishing time; and also by lobster fishermen who wish to avoid rough seas at ocean entry and normally fish in the eastern waters. Plan E would reduce economic damages to boats moored close, however, would do so by constructing a breakwater rather than increasing the mooring area. Again the reduction of damages would free up time that would otherwise be devoted to making boat repairs.

Effects on Educational, Recreational and Cultural Opportunities

40. Plan D is the only alternative that appears to have an effect on recreational opportunities. This plan, dredging the thoroughfare, would eliminate the use of the thoroughfare for access to Bar Island.

41. This effect has been displayed in the system of accounts, however, is not felt to be significant because access via the thoroughfare is not heavily utilized. Many wishing to recreate on Bar Island use small, private boats to reach the island. Most of these users are local residents. Access via the thoroughfare is limited as it is restricted by the tides.

42. Since Corea Harbor is almost exclusively utilized by commercial fisherman, the structural plans are not expected to have any other effects on recreational opportunities other than that mentioned above.

43. No educational or cultural opportunities within the area were identified as being effected by the plans.

Effects on Community Growth/Future Land Use Development

44. Overall, the plans make positive contributions to community growth and future development plans. Plan C, which combines Plans A and B, offers the most significant contribution. The increased anchorage space provided would allow an increase in the fishing fleet. Although, this increase would number four or five boats, it would allow some sons currently fishing with their fathers to buy their own boats and still base their operations in Corea Harbor. A look at the fleet ownership indicates that 26 of the 40 boats are owned among eight families. Some families wish to increase their operation by purchasing larger craft, however, the overcrowdedness of the anchorage has discouraged this.

45. Improving channel conditions would permit finfishing craft to safely navigate the harbor to land their catch, but would not allow any significant development in the finfishing industry since it does not provide for additional mooring space. Although the increased anchorage would provide some mooring space for finfish boats, channel conditions

would not be conducive to safe navigation and timely offloading of catch of these larger craft. Combining Plans A and B, however, would encourage the development of a finfishery in Corea Harbor. It is projected that with Plan C two to five boats of a 55-foot length would be added to the Corea Harbor fleet.

46. Plans D and E provide no particular stimulus for growth within the harbor.

Displacement of People and Business

47. Construction activities may disrupt and hinder the normal flow of people temporarily. However, there would be no permanent displacement or relocation of people or businesses as a result of project implementation.